

... THE IRON AGE ...

ESTABLISHED 1855

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Somebody Ought to Shoot Santa Claus

EX-GOVERNOR ALFRED E. SMITH, speaking about the general tendency to accept Government handouts, said that "nobody shoots Santa Claus." By Santa Claus, he meant, undoubtedly, the new spirit of "giving" which has transformed a once fairly businesslike Government into a gigantic "Insurance and Benevolent Association and Burying Society."

The act of magnificent giving creates a rosy glow in the heart of the giver and also makes the recipient feel good too—until his name is scratched off the giver's list. And, of course, when "Government money" is used to buy the presents, both giver and takers are not inclined to worry about paying Santa's bill.

But Santa Claus has to be paid and with compound interest; he is making no presents, free gratis, to anybody. And the recipients of his "gifts," in particular, will have to pay a particularly dear price for them.

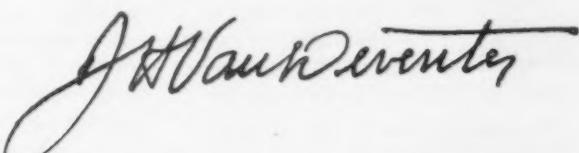
The farmer, for example, who receives a dole for curtailing his cotton crop and another dole in the form of Government protection of cotton price is buying these "gifts" at the cost of our loss of export markets. He is trading his birthright for a mess of pottage.

The locality which receives the "gift" of a public works project will pay many times its worth, for years to come, through labor inefficiency and indifference which will spread from these scattered cells of bureaucratic paternalism and inevitably infect neighboring private industry.

The steel maker who finds part of the \$4.8 billion trickling from Uncle Sam's hope chest into his plant in the form of steel orders will eventually pay through the nose, in increased taxes and in amount, many many times the profit he will make on the business thus obtained.

Most severe of all will be the payment exacted from many of those who are receiving "direct relief," who have come, or are coming, to value a pittance without work above an opportunity to find work and earn a living thereby. They are paying for their dole through the foreclosure of personal ambition.

When the spirit of economy and thrift flies out of the window of Government, it is a long and arduous task to coax it back again. And all of us, whether or not we are recipients of modern Santa's favors, will pay dearly, for years to come, for the glittering trinkets that are being broadcast from his pack.





THE average job-galvanizing plant handles a variety of objects. This large plate may be followed by a few washers each the size of a small coin, and they in turn by a huge ventilator for a trans-Atlantic liner.

Zinc Ammonium Chloride, Its Place

IN this, the first of a series of three articles, the author presents the interesting history of zinc up to the time of hot-dip galvanizing and also the subsequent growth and mechanization of the hot-dip process. Likewise, the history and various applications in galvanizing industry of hydrochloric acid, ammonia,

zinc chloride and sal ammoniac are reviewed. After bringing the galvanizing industry up to the current period, the author gives a brief résumé of the apparent advantages and disadvantages of zinc ammonium chloride as against sal ammoniac and hydrochloric acid.

moniac. It should be of interest, therefore, to briefly review the history of these ingredients and products, and of "hot-dip" galvanizing in order to build a logical basis on which to erect a discussion of zinc ammonium chloride and its manifold uses and advantages.

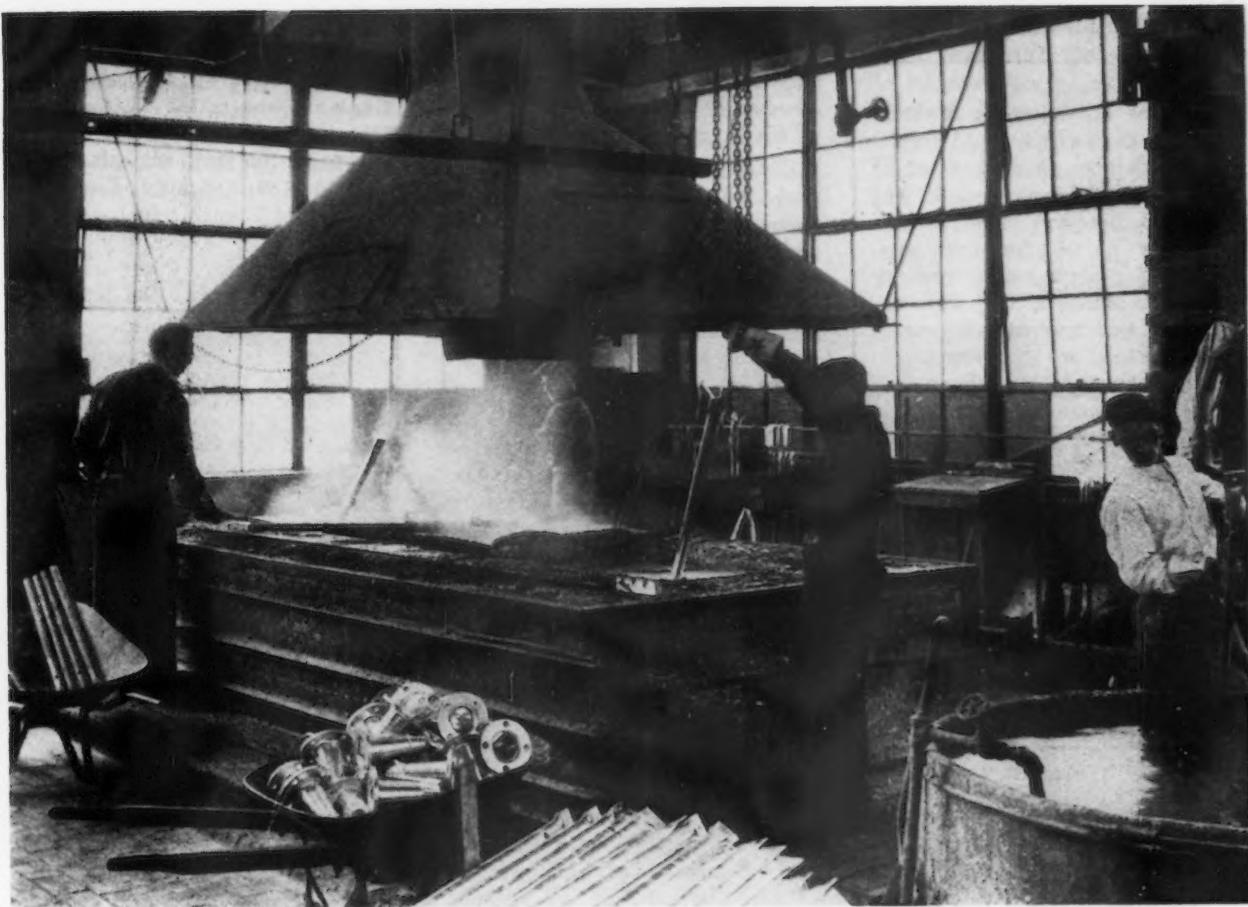
Among other things found in the ruins of Cameræ, destroyed in 500 B.C., were two bracelets filled with zinc. Thus this offers us, perhaps, the first tangible fact in connection with the use of the metal, zinc. In the works of Aristotle, the fourth-century Greek philosopher, brass is referred to as "Mossinoecean Copper", with the statement that it was made by melting copper with a certain "peculiar earth" found on the shores of the Black Sea. It is supposed that this peculiar earth was what



THE "hot dip" galvanizer of today is familiar with the three principal ingredients of galvanizing fluxes, *i.e.*, zinc, hydro-

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chloric acid and ammonia. These materials, in one or more combinations, are used by him under the names of zinc chloride, zinc ammonium chloride and ammonium chloride or, as the latter is best known the world over, sal am-



HAND galvanizing of pole line hardware fittings for high-power transmission lines. The fittings are entering the bath at the left, after which they travel under a bridge and are pulled forth by the man in the center foreground.

in Modern Galvanizing*

By H. G. HOBBS
Steel Service Engineer, Cleveland

we now know as calamine, one of the most common ores from which zinc is obtained.

Albertus Magnus, a Dominican monk, is credited by some authorities with the discovery of zinc during the thirteenth century which he called "marchasita aurea." However, it is first referred to by the name we know it in the volume, "Corrus Triumphalis Antimonii", which was written in the fifteenth century by Basil Valentine, although he does not refer to it as a metal. The first reference to zinc as a metal would appear to be by Phillipus Paracelsus, a Swiss scientist, who lived during the sixteenth century. In his writings Paracelsus states:

"There is another metal called the zinken which is unknown to the fraternity, and is a metal of a very singular kind."

During this latter period, traders to China and India were returning with cargoes of zinc and apparently the Chinese had been producing it for some time. In 1595 A. Libavius, one of the first to investigate zinc and its properties, referred to the Chinese metal as a "peculiar kind of tin" found in the East Indies and called "Calaem". In 1620 a cargo of zinc from the East Indies was sold in Holland as "spialter". R. Boyle, an English scientist, Latinized this name by calling it "speltrum". Thus originated the designation of "spelter," which is now the universal term for slab zinc.

While Johann Glauber stated in the sixteenth century that calamine was an ore of zinc, it was 1721 before Johann F. Henckel discovered and made known the fact that zinc could be obtained

from calamine. In 1739 John Champion, an Englishman, was granted a patent on his "distillation downward" process of obtaining zinc, and a year later he commenced the first commercial production of this metal in Europe. However, while Champion actually produced zinc, the great bulk of Europe's consumption continued to be imported from China for many years.

Having made a study of Champion's work and having learned the art of zinc making in England, one Kammerassessor Johann Ruhberg, of Pless, Germany, built the first zinc furnace in Silesia in 1798 or 1799. At about the same time, a man by the name of Dillinger, of Klagenfurt, Austria, invented a practical method for smelting zinc, and it is to him that credit is given by most authorities for hav-

ing built the first zinc distillation furnace on the European continent.

Unaware of the work of Ruhberg and Klagenfurt, Abbé Daniel Dony, a Belgian chemist, after 25 years of experimentation, in the year 1805 discovered a method of extracting zinc from its ore. But, Dony's attempts to produce zinc in a commercial way were unsuccessful and he died a few years later a ruined man. However, in 1818, Dominique Mosselman, an enterprising manufacturer and a financial backer of Dony, carried on Dony's work, and his efforts culminated in what has since been known as the Belgian process of smelting zinc.

Zinc was first produced in America in 1838 at the Washington Arsenal. Commercial distillation was attempted in 1850, but it was not until 1860, when a Belgian process furnace was installed and operated at Bethlehem, Pa., by the Lehigh Zinc & Iron Co., that the production of zinc in this country became an established business.¹

Hot-Dip Galvanizing Inaugurated in 1820

The word "galvanize" is derived from the name of Dr. Luigi Galvani, an Italian scientist, who, during the latter part of the eighteenth century, made important discoveries in connection with the use of electric current to deposit one metal on another. For many years the term "galvanized" was used to designate all coated products regardless of the metal used for the coating, its specific use with reference to zinc-coated products being confined to the last half century.

While one Paul Jacob Malouin² is said to have invented a process for coating iron with zinc in 1742, the first practical work in "hot dip" galvanizing seems to have been done by E. Morewood of England in 1820, when he coated sheets

¹ Historical data on zinc was for the most part obtained from "Production and Properties of Zinc," by W. R. Ingalls, 1902, Pages 1-15, and "Metallurgy of Zinc and Cadmium," by H. O. Hofman, 1922, Page 2.

² Lang: *Revue de Metallurgie*, 1912, Vol. 9, Page 21.

³ History and Development of Galvanizing, the Meeker Co., Chicago, 1914.

⁴ British Patent 7355, April, 1837.

⁵ British Patent 11476, December, 1846.

⁶ British Patent 2144, September, 1860.

⁷ Historical data on muriatic acid obtained for the most part from "Inorganic and Theoretical Chemistry," by J. W. Mellor, Vol. 2, Page 20.

of iron with tin by the "wash tin" method and then immersed the tinned sheets into molten zinc. Morewood was granted a patent on his process in 1821.

Credit is given to H. W. Crawford,⁴ an Englishman, for introducing the basic principles of "hot dip" galvanizing, and various features of his process, on which a patent was issued in 1837, are still used in modern galvanizing. Crawford successfully galvanized sheets, link chain, cut nails and wire.

In 1846 E. Morewood⁵ and H. Rogers of England were granted a patent on a process for running sheets continuously through molten zinc; and in 1860 George Bedson,⁶ also of England, secured a patent on the process of continuous annealing, cleaning and galvanizing of wire.

Hydrochloric Acid Identified in Fifteenth Century

Hydrochloric acid is one of the most important ingredients in the manufacture of both zinc chloride and sal ammoniac, and, from a consumption point of view, second in importance of all the commercial acids; yet considerably less is known of its history than what is obtainable on most of the products which go into the making of steel and its allied products.

The first reference to this acid would appear to be by Caius Pliny, the Elder, in his *Historia Naturalis* in which he describes the purification of gold by heating it with salt, misy (iron or copper sulphate), and schistos (clay), this mixture giving off fumes of hydrogen chloride.

Arabian alchemists, although unaware of it in its pure form, employed hydrochloric acid in the making of "aqua regia," which from their writings we learn was made by distilling saltpetre, sal ammoniac and iron sulphate.

In the fifteenth century Basil Valentine identified hydrochloric acid for the first time. He called it "spirits of salt" and obtained it in an aqueous solution by distilling iron sulphate with sodium chloride. In the seventeenth century Johann R. Glauber obtained it by distilling sodium chloride with sulphuric acid; and in 1727 Stephen Hale, of England, obtained it by distilling sulphuric acid with sal ammoniac.

The first pure preparation of gaseous hydrochloric acid was obtained in 1772 by J. Priestley of England, who called his discovery "Marine Acid Air", in reference to its production from sea-salt. However, in 1789, Antoine L. Lavoisier, an eminent French scientist, in his "Elements of Chemistry" gave Priestley's discovery the name of "muriatic acid" with the following explanation:

"Although we have not as yet been able, either to compose or decompose this acid of sea-salt, we cannot have the smallest doubt that it, like all other acids, is composed by the union of oxygen with an acidifiable base. We have, therefore, called this unknown substance the muriatic base or muriatic radical, deriving this name, after the example of Mr. Bergman and Mr. Morveau, from the Latin word 'muria,' which was anciently used to signify sea-salt."

Lavoisier goes on to state that as further experiments brought about the complete identification of muriatic acid, it was quite likely that new bases or radicals would be discovered which would cause it to receive a new designation, and this came to pass with the adoption of the name "hydrochloric acid" when Sir Humphrey Davy in 1810 conclusively identified Priestley's "marine acid air" as a hydrogen derivative of chlorine. Nevertheless, hydrochloric acid is still known and used by the consuming industry as muriatic acid.⁷

Ammonia Was Known in Fifth Century

Ammonia, one of the major chemicals in the composition of sal ammoniac, has an interesting history. Although the first mention of it as a gas or vapor appears to have been by Johann Kunkel in 1677, who observed that a white cloud was formed when the vapors came into proximity with a volatile acid, the discovery of pure ammonia gas in 1774 is credited to J. Priestley of England, who gave it the name of "Alkaline Air".

Chemical identification of Priestley's "alkaline air" was made by C. L. Berthollet in 1785, and by Austin in 1788, with credit for the first complete analysis or composition of ammonia given to the former. In 1805 Berthollet's work was further confirmed by A. B. Berthollet.

However, from a point of interest to the galvanizing industry, it would appear that compounds

of ammonia were known and mentioned as early as the fifth century B.C. Herodotus, the historian, refers to the "Ammonians who live in the hills of Libya"; and in the third century B.C., Hippocrates, the Greek scientist, uses the word "Amoniokan".

In the first century A.D., Caius Pliny, the Elder, in his "Historia

part of common salt, and one and a half parts of the soot of logs or sticks. When these have been heated together until the moisture is evaporated, true and useful sal ammoniac is sublimed. Mix the product with common salt and sublimate again, when the preparation is complete."

In the fifteenth century Basil Valentine spoke of sal ammoniac, Armenian Salt, salt from Armenia, and Armenia sal ammoniac; and from the sixteenth century on,

be in all respects like ordinary sal ammoniac. This is considered to be the first direct synthesis of ammonium chloride.

The term "spiritus urina" soon became "volatile salis ammoniaci", and it was the subsequent work on and treatment of this chemical with acids, alkalis and lime, by Johann Kunkel, Raymond Lully,



ANOTHER scene showing the galvanizing of pole line hardware. At the extreme right the coating is being set by dipping in the water tank.

Naturalis", referred to a salt called "hammoniacum" and particularly remarked its "vehement odor"; and in the same century the scientist, Marcus Apicius, referred to the use of "sal ammoniacum in cooking".

In the eighth century, Geber, an Arabian scientist, whose full name and life is shrouded in mystery, in his "De investigatione magisterii", applies the term "sal ammoniacum" to what is now known as sal ammoniac. His reference reads as follows:

"Sal Ammoniae is made from two parts of human urine, one part of the sweat (sudoris) of the same, one

various writers have used the term "Sal Ammoniacum" or "Sal Armeniacum" for ammonium chloride, or for salts containing volatile alkali as distinct from those containing fixed alkali. Approaching the seventeenth century the term "sal ammoniac" was almost generally used for ammonium chloride.

During the fourteenth century many references are found as to "spiritus urina" or "spiritus volatilis salis armoniaci", and it was about this time that three scientists, O. Tachen, R. Dossie, and A. Sala, stated that if "spiritus urina" (aqua ammonia) was mixed with "spiritus salis" (hydrochloric acid) the product would

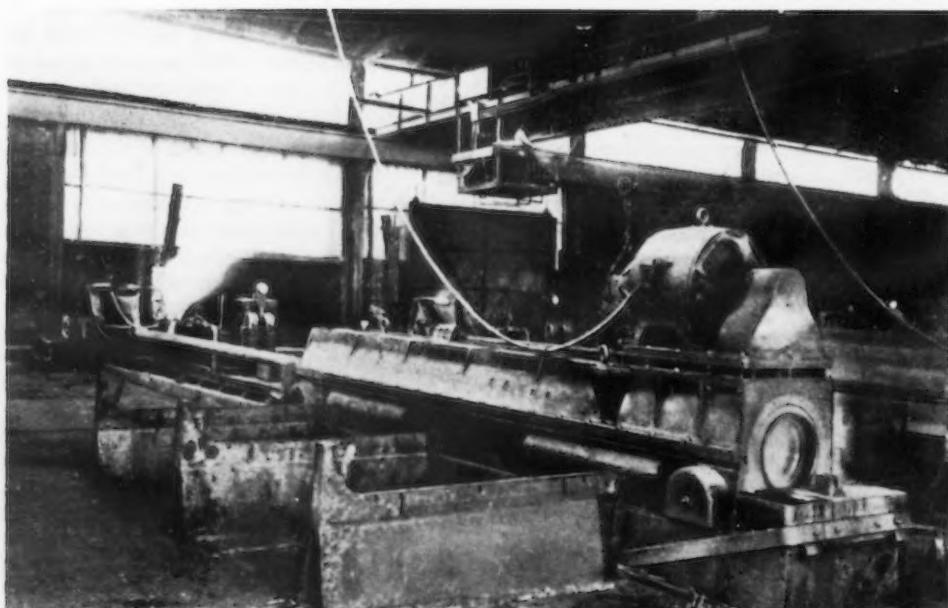
R. Boyle, and others, that led up to Stephen Hale's experiments in the heating of sal ammoniac and lime. A continuation of Hale's work by J. Priestley, who used mercury to entrap the gas, served to bring about the isolation of ammonia gas in 1774.⁸

From data currently available, these facts comprise the historical background of the three ingredients, zinc, hydrochloric acid and ammonia, which go to make up the galvanizing fluxes which are known today: zinc and hydrochloric acid in the manufacture of zinc chloride, and hydrochloric acid and ammonia in the manufacture of sal ammoniac. Al-

(CONTINUED ON PAGE 84)

⁸ Historical data on ammonia obtained for the most part from "Inorganic and Theoretical Chemistry," by J. W. Mellor, Vol. 8, Pages 144-145.

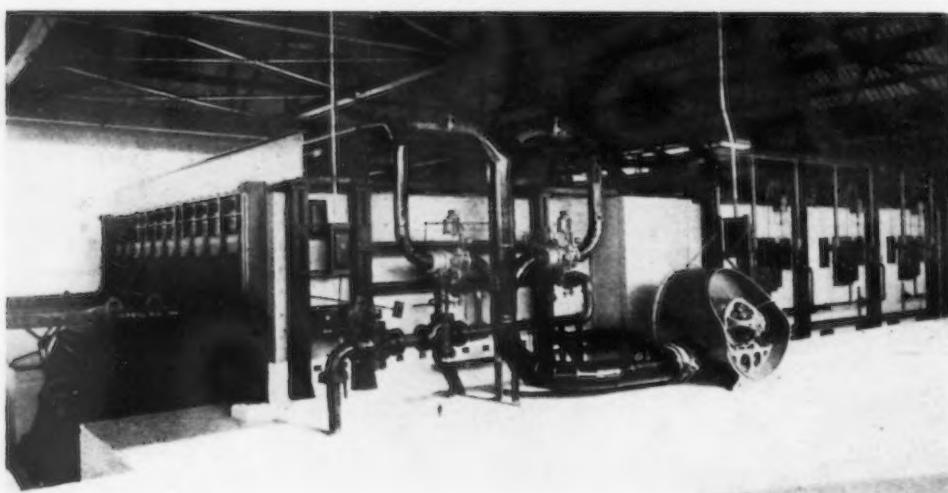
Pipe Cast Co.



AT TOP

CENTRIFUGAL casting machine with ladle on car in background. A transfer ladle is suspended from the overhead crane.

o o o



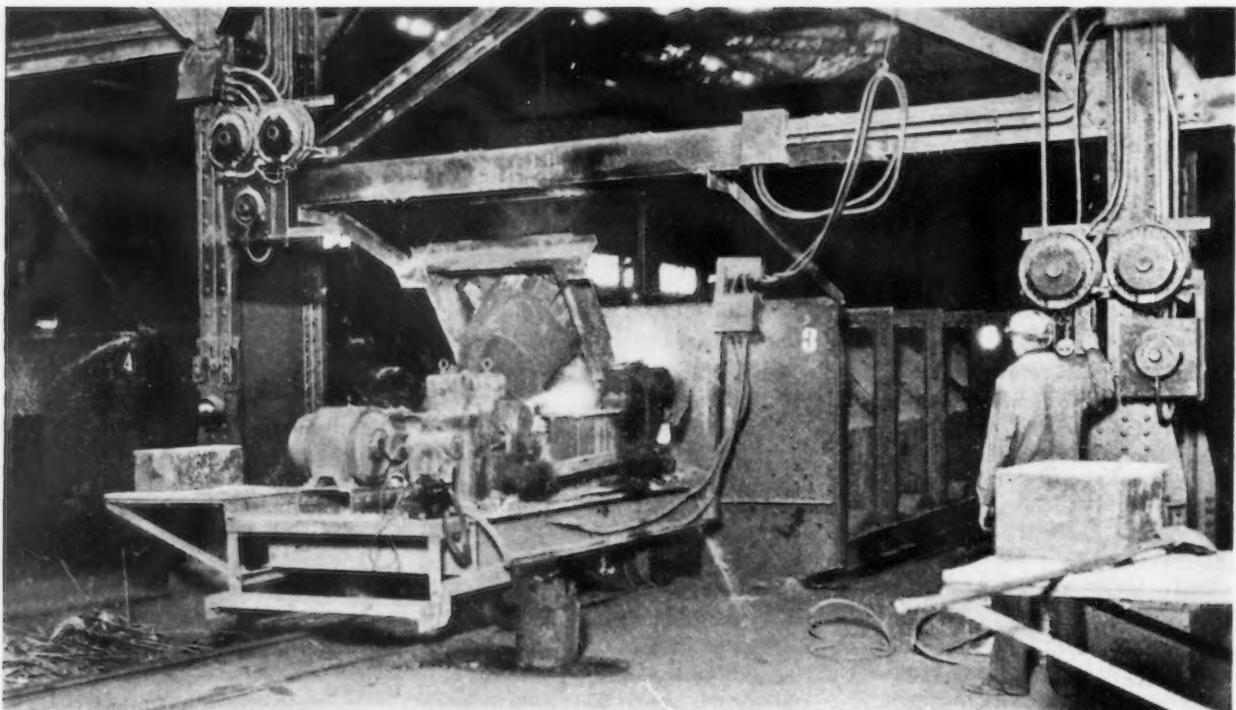
AT LEFT

GAS-FIRED annealing furnace which is automatic and continuous both as to temperature and operation.

o o o

BELOW

POURING end of centrifugal casting machine showing tilting ladle and car, together with operator and remote controls.



Cast Centrifugally Without Chill

By J. B. NEALEY

American Gas Association



THE deLavaud centrifugal process of making cast iron pipe employs a water-cooled rotating steel mold into which the molten iron is charged from a specially designed trough. The original process produced chilled castings, the chill being removed in the annealing oven. It was recently discovered that the chill could be obviated, and that the physical characteristics of the casting so produced could be further improved by a suitable heat treatment. This product became known as super-deLavaud pipe.

The deLavaud casting machine consists essentially of a steel mold mounted on rollers in a water bath. This mold can be rotated at high speed by an electric motor. The water jacket, propelled by a hydraulic piston, is mounted in turn on wheels which run on a slightly inclined track. A trough, also water cooled, is so placed that when the mold is at the upper end of the track the trough extends into the mold for almost its entire length and when the mold is at the lower end the trough is wholly exposed.

There is also a ladle, electrically

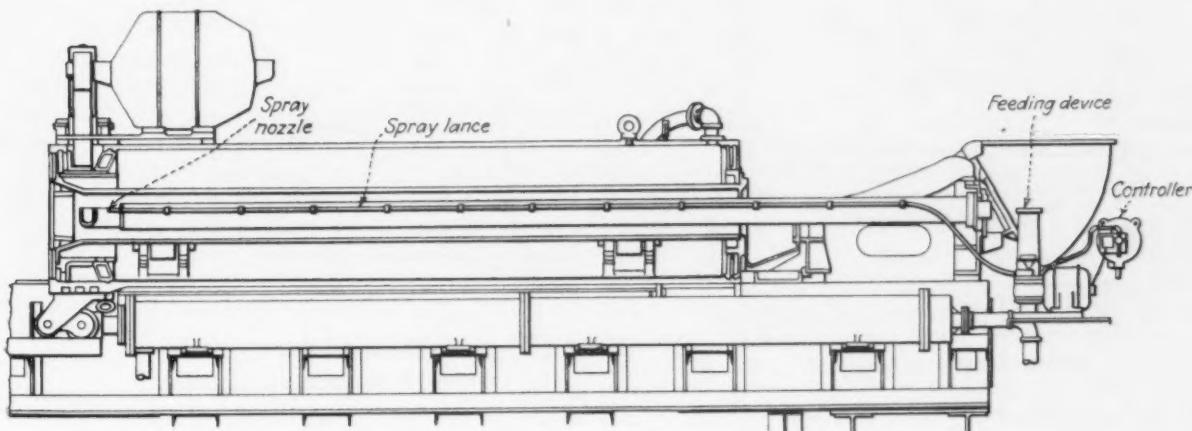
operated, and designed to deliver a uniform quantity of iron to the trough during the casting operation. The casting cycle begins when the mold is at the head of the track. Into the bell end of the mold there has been inserted a dry-sand ring core to form the socket. The mold is rotating and the ladle is tilted to deliver a uniform stream of iron to the trough. As soon as the bell space is full, the rotating mold is slowly moved down the track at the same time iron is being delivered to the mold from the trough. Centrifugal force does the rest, fusing the stream of metal into a homogeneous pipe against the steel walls and holding it there until it has set.

Powder Blown on to Mold Surface

The method of producing super-deLavaud pipe, as the new unchilled castings are called, is accomplished by a mechanism which places a thin layer of ferroalloy powder against the inside walls of the mold just in advance of the stream of iron as it is being poured. A motor-driven mechanism is used to supply the correct quantity of powder, which is blown

on to the mold surface by compressed air. The effectiveness of the small amount of powdered material in preventing chill is due to the fact that the particles impelled by the carrier gas against the mold, are surrounded by an absorbed film of gas. This film, for an appreciable time after the powder is deposited, forms an effective part of the coating and performs an important function in bringing about the absence of chill and a desirable structure in the casting.

The quality of the unchilled castings so produced is greatly improved, and this is further improved by a suitable heat treatment in a gas-fired oven which is both continuous and automatic as to operation and temperature control. The method of casting super-deLavaud pipe, as well as the heat treatment, was devised and developed by the research engineers of the United States Pipe & Foundry Co., and the two existing centrifugal plants of that company, to wit: Birmingham, Ala., and Burlington, N. J., were adapted to manufacture super-deLavaud pipe. In addition, a centrifugal unit comprising five casting machines



CROSS-SECTION of casting machine showing mold, sprout, trough, pulverant spray nozzle, ladle and feeding device.

was installed at Bessemer, Ala. The new plant at Bessemer has three cupolas, two forehearts and one gas-fired annealing oven.

The forehearts, which are used one at a time, are preheated by a gas burner firing down through the top. Their function is to purify the molten metal and, once full, they retain their heat to such a degree that the gas burner may be shut off. A transfer ladle carried by a crane takes the iron from the foreheart and distributes it to the machine ladles.

Pipe Rolled Through Annealing Furnace

The annealing furnace is of brick and refractory construction, is insulated and held within a steel case. It is equipped with two big closed looped chain conveyors, motor driven. Many upright fingers are attached to the chain links in such a way that the pipe rolls instead of being pushed through the furnace. This rolling is up an incline, as the hearth line is elevated toward the discharge end, this design being adapted to prevent any movement except that under the control of the conveyor. The spacing of the fingers allows for pipe sizes ranging from 4 to 24 in.

What is known as the hearth is

a series of alloy pipe skids split up into 140 sections so staggered and pitched as to eliminate a continuous contact with the pipe. These are supported on alloy chairs passing through and out the bottom of the furnace to special adjusting pedestals. The hearth must be maintained within 1/32 in. throughout the entire area of the furnace as it refers to the flat surface in relation to pipe contact. One of the interesting features of this furnace is that the movement eliminates any slight out-of-roundness of pipe, that is, the pipe is accurately straightened by the movement in its course through the furnace.

This furnace is 70 ft. long and 25 ft. wide and is heated with 24 gas burners, 12 on each side. Eight of these gas burners, four on each side, are located in the first 20 ft. of the furnace, while the remainder are located in the next 20 ft. in two rows. These burners are of the nozzle mixing type, and air is supplied to them at 1 lb. pressure from a large air blower. This air, as well as the gas, is piped to the burners in three separate manifolds which segregate the burners into three distinct sets. Each set has a separate automatic temperature control of the potentiometer type actuating a solenoid valve.

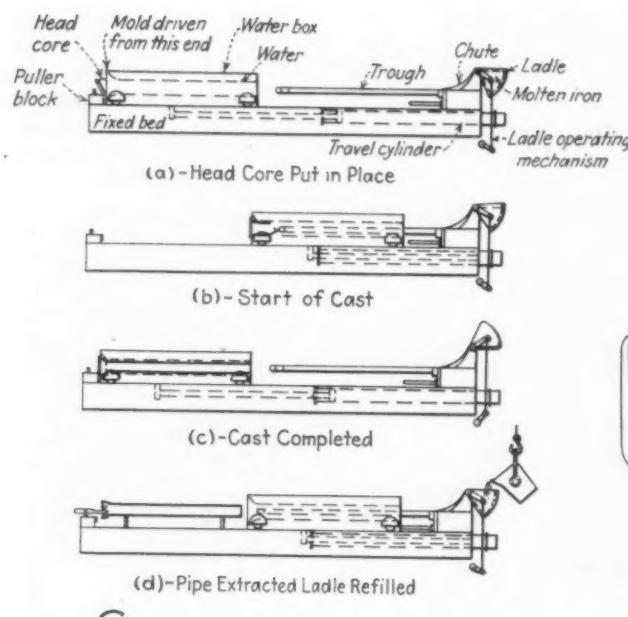
Thus the furnace is divided into three hot zones and a cooling zone.

Annealing Period Is One Hour

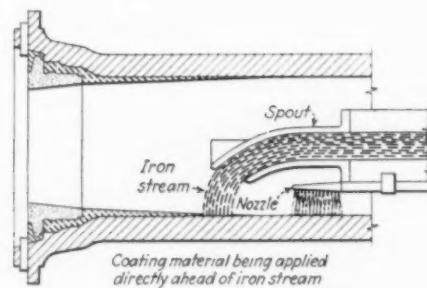
The hot zone is 7 ft. high by 35 ft. long and the cooling zone is 10 ft. high and 20 ft. long, and the hot products of combustion are sucked out through flues located between the hot and cooling sections. The annealing period is approximately one hour and a Shore hardness of 30 on the annealed pipe is the limit allowed. Recording pyrometers and other control instruments are located in a central control house. The three zones of the heating section consist of two gas burners that take care of the heat loss at the swinging door and the pre-heat or work saturating zone, while the last is controlled by a separate zone on each side of the furnace. This provides additional heat for the bell end of the pipe, which, of course, is heavier than the other sections.

Pipe made by this process has 100 per cent more impact resistance, greater ductility and toughness, greater carrying capacity, and is easier to cut and tap. The pipe is discharged from the furnace on to a runway where the inside is reamed out with rotary grinders, the ends ground, and the

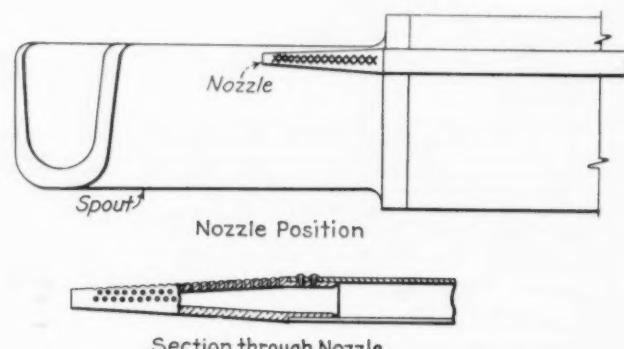
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CASTING cycle for super-deLavaud pipe.



APPLYING the pulverant material directly ahead of the iron stream.



PULVERANT distributing nozzle, showing nozzle position above and section through nozzle below.

Late Returns from Laboratory And Mill

By T. W. LIPPERT

The Iron Age, New York

PERMANENT molds of stone, discovered in Cornwall, England, are estimated to have been used over 3000 years ago. . . . German investigators report the beneficial effects of copper inoculations into cast iron; English researches have announced the elimination of pinholes in aluminum castings through the application of high pressures, and a unique method of rapidly testing the corrosion resistance of metals. . . . A letter from Siberia indicates the current status of Russia's steel industry.

Permanent Molds Used in 2000 B. C.

THE subject of permanent molds has occupied the attention of foundrymen for a great many years, and the problem is even now far from completely solved. Therefore it is with considerable respect that the industry in 1935 views an example of permanent mold casting which must have enjoyed considerable success nearly four thousand years ago.

Toward the end of 1934 a workman employed in a quarry at St. Teath, Cornwall, England, excavated two hollowed out stones, each half bearing the form of a

battle axe. The pieces were easily fitted together to make the top and bottom portions of a stone mold; archeologists judge the stones to have been used in 1000 to 2000 B. C. This mold, since its discovery, has been used to cast a white metal axehead which bears the decoration engraved on the original stones. The mold and experimental casting are shown in Fig. 1.

The mold is made of what is called freestone, a softer stone than that of the quarry in which it was found. It is about 5 in. by 3 in. and weighs about 6 lb. The soft stone was probably used in order that the mold maker could

work it with a harder stone as a tool.

It has hitherto been supposed that following the Stone Age, in which all weapons and utensils were fashioned in stone, there occurred the Bronze Age. Native ores of copper and tin were probably sufficiently near the surface of the earth to be turned up by a primitive plow and, when submitted accidentally or deliberately to the heat of a fire, the metal had a sufficiently low melting point to run off and form a primitive ingot. It has generally been held that the resulting bronze, being malleable, was shaped by stone tools to whatever purpose the aborigines desired, after being heated in a primitive wind furnace. The mold in Fig. 1 shows that these early men knew the value of casting directly in the shape desired. The present owners of the mold,



FIG. 1—Two hollowed out stones, each half bearing the form of a battle axe. This example of permanent molding is judged to have been used in England in 1000 to 2000 B.C. for the casting of bronze axes. An experimental white metal casting is shown beside the molds.

Messrs. T. H. Oliver & Sons, St. Teath, Cornwall, are looking for a buyer.

and as-cast bars, but the copper was found to have little effect on the corrosion resistance of the iron to the attack by tap and sea water.

Copper Improves Gray Cast Iron

DIE GIESSEREI has just reported an extensive study of the effect of copper as related to mechanical and physical properties of cast iron. The iron base analyzed 3 per cent total C, 2.2 to 2.6 of Si, 0.7 Mn, 0.1 P, and 0.026 S. The experimental copper content was varied from 0.56 to 1.92 per cent.

Precipitated copper particles were found in the annealed test bars, and the quantity precipitated increased with a higher copper content. In the as-cast bars, no copper particles could be detected. The transverse and shear strength of the iron increased up to 1.5 per cent of copper, and then decreased. The deflection decreased continuously. The increase in strength must be attributed to the finely-divided copper particles. Subsequent annealing in the precipitation range of copper (400 to 600 deg. C.) gave no further increase in hardness, which shows that the bars had been fully age-hardened in the mold.

Copper additions were found to substantially improve the resistance of the iron to rolling friction. Likewise, sliding friction resistance was improved by copper additions. Magnetic coercive force and remanence advanced with increasing copper content in both the annealed

industry. Therefore it is of interest to quote a recent letter to Leo F. Reinartz, of American Rolling Mill Co., from R. Vaill, of Freyn Engineering Co., who is now in West Siberia.

"... problems which confront the Russians are, to my mind, entirely novel to Americans. These fellows here are curious, have thrown away all conservatism, and investigate all aspects of steel mill and open-hearth problems. They are skeptical of American practice, and are not satisfied with German technique. They are trying to wean themselves away from their old German-Russian practices; they study night and day, and they try anything once. They are developing metallurgically at an astounding rate. Over 70,000 tons of steel were produced last month from 10 furnaces, and Siberian winter to fight every hour; ten-hour heats (and not bad ones) from 150-ton furnaces, using 60 per cent iron charges."

The Proletariat Makes Steel

HERE is considerable confusion in this country as to the current status of the Russian steel

Compares Steels Photo-Electrically

FOR years chemists and physicists have exposed selected steels and metals to corrosive action, and

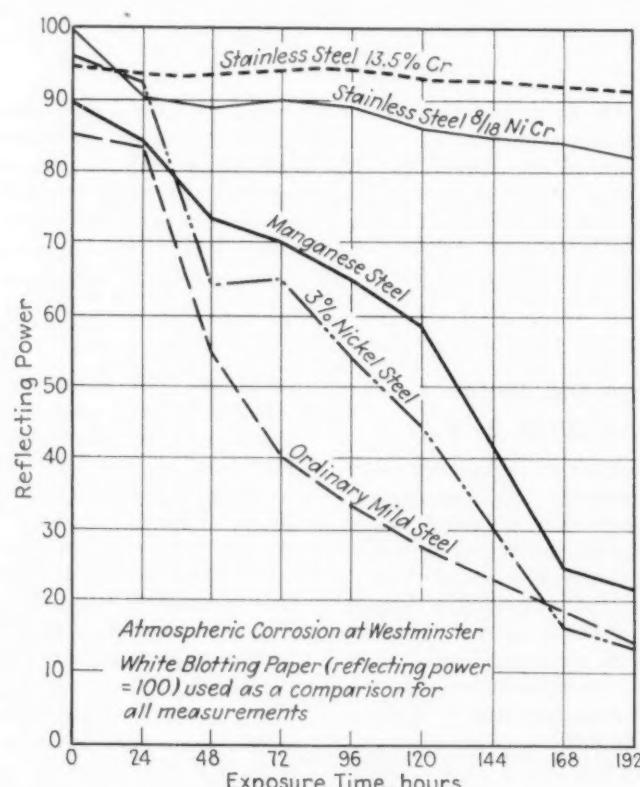


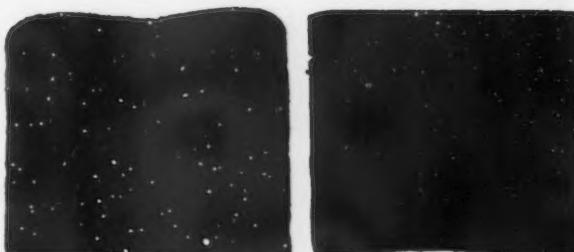
FIG. 2—Five steels compared as to their ability to resist the action of industrial atmospheres. Photo-electric equipment was used for this rapid test, and indications are that this method will gain favor for the measuring of corrosion resistances.

chronicled the loss of weight by means varying from chemical analyses to the photographing of notorious examples of wastage. When corrosion films are relatively thick deposits of oxides, sulphides or chlorides, chemical analysis is the final and quick method of determination. But long periods of time are necessary for thick deposits to form. For this reason, therefore, thin films are occasionally studied, even though the analysis of microscopic films has usually been slow and complicated.

Recently the *Engineer* gave a detailed account of a photo-electric method used to determine the loss of reflecting power of polished steel in order to compare the relative intensity of action of corrosive attack of atmosphere in and near industrial centers. The apparatus consists of a standard lamp drawing a specified current, the light from which diffuses through a screen and on to a sample. The reflected light is measured by a photo-electric lamp in conjunction with a galvanometer. The reflection from a piece of white blotting paper is considered equal to 100 and is taken as a standard against which all steel surfaces are compared.

Prior to exposure, the steels are highly polished. Care is taken to remove all traces of the polish by washing in methylated spirit and rinsing in distilled water. Readings are taken of these samples, after which they are exposed. At frequent periods the samples were washed free of dust, soot and other deposited adherent matter after which readings are taken and

FIG. 3—These ink contact prints show the ability of pressure to remove pinholes in aluminum alloy castings. The ingot on the left solidified under atmospheric pressure and the one on the right solidified under 25 lb. per sq. in. pressure.



graphed. In Fig. 2 there are graphed numerous data on a variety of steels. It can be seen that 13.5-Cr stainless steel resists corrosion the best whereas 18-8 stainless is next best in retaining reflecting power. So far no correlation has been made of these data with the direct measurements of a detailed chemical analysis. But the method is believed to have considerable value as a quick and accurate method of measuring corrosion resistance of metals and steels.

Pinholes in Aluminum Castings Eliminated

BIRMINGHAM UNIVERSITY has just released data on experiments in which aluminum alloy melts were cast in sand molds and allowed to solidify under an extraneous pressure of air or nitrogen. By this procedure pinholes can be completely eliminated by a suitable adjustment of experimental conditions, a result considered to be of great interest from both theoretical and practical aspects.

Skin-dried green-sand molds were placed in position in an auto-

clave and the cover was bolted down. A quantity of stock alloy was melted in an electric furnace and the temperature increased to 750 deg. C. The metal was then poured via a funnel into the molds, the pouring inlet was quickly closed, and a predetermined pressure of gas was turned on. Subsequently, the ingot produced was sectioned, polished and etched for visual examination of pinholes. The ink contact prints in Fig. 3 show how pressure markedly reduces the quantity of pinholes.

The application of gaseous pressure during solidification improves the density and soundness of all aluminum alloys which have been examined. With those alloys which show a more marked tendency to form internal shrinkage cavities, such as the eutectic silicon-aluminum alloy and the eutectic nickel-aluminum alloy, the increase in size of this cavity with pressure is noted. Pressure cast aluminum alloys show marked increases in hardness, amounting to as much as 10 Brinell points under a pressure of 200 lb. per sq. in. This hardness increase comes from the greater soundness of the castings, as no metallographical change has been noted.

Will Present Foundry Papers in Europe

THREE members of the American Foundrymen's Association have been chosen to present papers on American practice before meetings of European foundry associations to be held this summer. This exchange of papers among the leading foundry organizations of the world has been followed for several years and has resulted in the holding of International Foundry Congresses, the last one having been held in Philadelphia in October, 1934, under the auspices of the A.F.A.

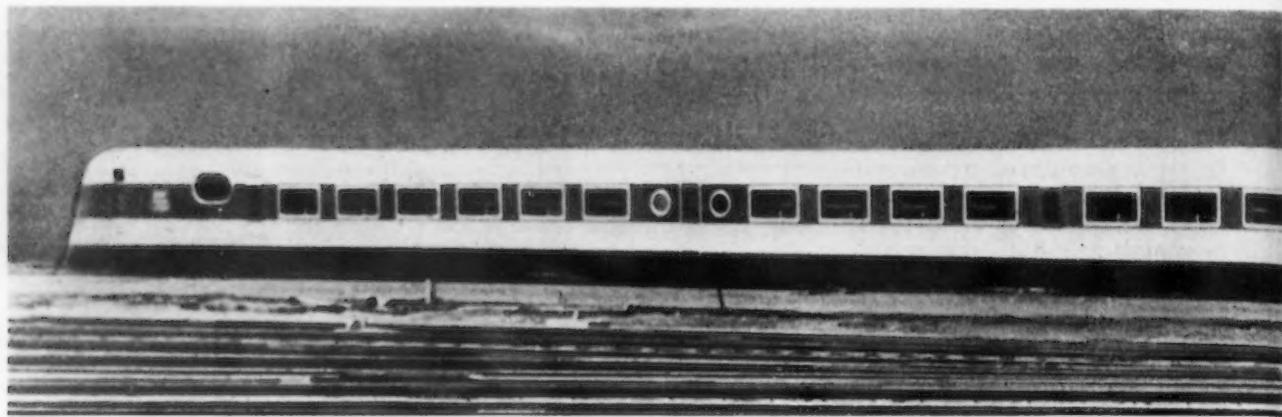
George Batty, technical direc-

tor, Crucible Steel Castings Co., Lansdowne, Pa., and a director of A.F.A., is to present a paper entitled "Controlled Directional Solidification of Steel Castings" before the June meeting of the Institute of British Foundrymen.

Dr. Harry A. Schwartz, director of research, National Malleable & Steel Castings Co., Cleveland, is to present a paper before the September meeting of the Association Technique de Fonderie de Belgique, the Belgian technical foundry association. Doctor Schwartz's paper will present the commercial and technical possibilities of malleable cast iron. The Belgian Congress will be held in Liege.

For the October Congress of the French Technical Foundry Association, which will be held in Paris, the A.F.A. exchange paper will be presented by W. G. Reichert, metallurgist, Singer Mfg. Co., Elizabeth, N. J. Mr. Reichert's paper will deal with the "Present Status of Investigation and Control of Molding Sands."

The American Radiator Co. has announced that its Pierce plant in Buffalo will be in production in July or August, following three years of idleness. General contract for the rehabilitation of the plant is reported to have been let to the Austin Co., Cleveland.



Colorful Finish Accentuates Streamline



THE interior was given a single color motif, starting with brown at the floor level and being carried out in various pastel shades to the ceiling, which is a pink-white tint of medium gloss enamel, combining dirt resistance with soft diffusion of light.

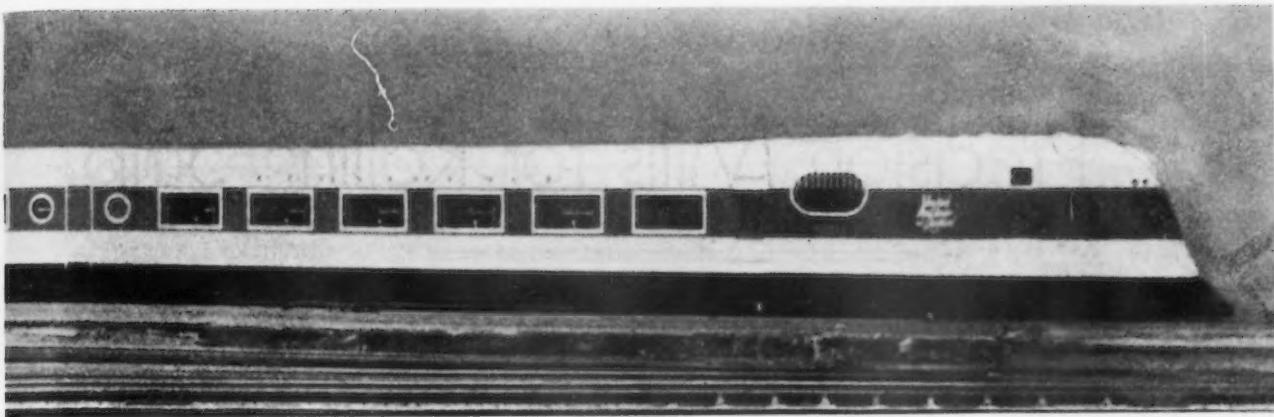
By K. H. WOOD

General Manager, Railway and Transportation Sales, Sherwin-Williams Co.



THE Comet, streamlined train of the New York, New Haven & Hartford, incorporates for the first time on any train streamlining with colors. Both the inside and outside of the train represent the most advanced application of color to a fundamentally sound aerodynamic design. Taking a cue from the sales appeal of well-designed and colorful products and packages, the New Haven railroad made every effort to study, not only materials, but the most effective treatment of these materials with a view to making the Comet look streamline on the outside and feel streamline within.

The train is actually only about half the weight of standard equipment per passenger capacity. It is capable of faster speeds and quicker acceleration, and has a center of gravity about 20 per cent lower than former equipment. But aside from accomplishing these features was the desire to psychologically reproduce them in the appearance of the train. To accomplish this the Goodyear-Zeppelin Corp., the New York, New Haven & Hartford and Sherwin-Williams engineers got together to work out a color scheme that would enhance the streamline effect, increase the



Streamline Appearance of Comet

apparent length of the train, and that would suggest speed, stability and grace. Actually the problem of the decorator has been simplified by the wider latitude of possible colors and by the simpler physical characteristics of the streamline train. Logically, the most effective color treatment is one that is in keeping with that very simplicity and lends itself to the natural flow lines of the train.

Bands Run Length of Train

In the case of the Comet, the engineers decided upon three colors. These are applied as bands running the length of the train, and serve to make the train appear lower as well as longer. The roof is finished in gray enamel closely matching the natural tones of the aluminum alloy of which the train is constructed with the exception of the trucks.

The first wide ribbon is of the natural aluminum machined to a brilliant whorled effect and given two coats of clear synthetic varnish to protect the shiny aluminum from tarnishing.

Lending contrast to the aluminum finish is an ultramarine blue enamel ribbon just slightly wider than the window panels and at the window level. This band encircles the entire train. Parallel to it and narrower is a darker blue band which skirts the train. This darker skirting band gives a feeling of strength and weight to the lower portions and emphasizes the lower center of gravity.

The blue band at the window
(CONTINUED ON PAGE 96)



A WIDE ribbon of aluminum machined to a brilliant whorled effect runs the length of the train. Above is a ribbon of ultramarine blue enamel, and below is a narrower, darker blue band, which skirts the train. The roof is finished in gray enamel.

Precision Mills for Rolling Strip,

Discussions by W. C. OBERG, Carnegie Steel Co., Pittsburgh—EARL SMITH, Republic Steel Corp., Youngstown, Ohio—J. T. SOMERS, Wyckoff Drawn Steel Co., Pittsburgh, Pa.

THE past 10 years have brought about numerous developments in the art of rolling metals. The outstanding achievement has been the progress made in the rolling of thin, wide sections in continuous strip and sheet mills.

Ten years ago progress in rolling strip steel had practically stopped. Existing mills were able to roll hot strip commercially up to about 24 in. wide by 12 gage. Narrower widths were obtainable as thin as 16 or 18 gage. Strips of thin gages wider than 24 in. could be produced only at great sacrifice to length of coil, considerable increase in power and decreased tonnage output.

To permit rolling wider strips it was necessary to increase roll diameters. An inevitable increase in rolling load, due to increased area of contact between rolls and strip, was the result. Thus roll-neck friction was further increased with consequent greater power consumption.

The only solution was to design a mill with relatively small working-roll diameters, which was stiff enough to permit rolling strip within commercial tolerances. Thus the use of backing-rolls appeared to be the only logical step.

The four-high mill, which had been tried out in the rolling of wide plates, offered the best possibilities. Since the power cost is important in the rolling of thin material, the use of roller bearings on such mills became of prime importance. This type of bearing was also a great factor in the elimination of excessive heating at the high delivery speeds involved and, of course, reduced so-called bearing wear to an almost infinitesimal figure. In the rolling of thick material this wear was not of prime importance but it did be-

come vital in rolling material of 16 or 18 gage.

Accordingly roller bearing manufacturers in cooperation with mill builders conducted a series of tests which dictated the design of proper bearings.

The roller bearing operates practically without heat or wear and is particularly adapted to high speeds. Since any suitable ratio of roll diameters may be used in the four-high mill, it can be built around the proper bearings. In other words, roller bearings of ample load-carrying capacity establish the size of rolls to be used.

This is a definite departure from the principle of the old types of mill where roll sizes determine bearing sizes.

In a consideration of the ratio of roll diameters in four-high mills, it is important to point out the following factors. It was previously stated that increasing roll diameters advance rolling pressures and consequently increases neck-friction. The friction loss in roller bearings is extremely small, and power savings of 50 per cent and over have been recorded. Consequently larger working-roll diameters, capable of withstanding greater stresses, can be used with almost no effect on the total power consumption.

For the cold-rolling of wide strip, the four-high mill was of even greater importance. Strip of 16 or 18 gage is reduced to 30 or 32 gage, and the rolling loads encountered are greater than those experienced in hot rolling. Such reductions are now being made on continuous or reversing mills with delivery speeds of 800 ft. per min.

The accuracy of rolling with these mills is remarkable. On hot-mills rolling wide strip it is not uncommon to roll with variations in thickness of less than 0.002 in. from edge to center and from end to end.

Four-high mills rolling thin gage material must be classed as precision mills. Measurements of thousandths of an inch are dealt with and the equipment must be made accordingly. Trained crews must be employed to obtain the desired results.

Center Fullness Necessary

The metal rolled must be carefully watched in the early stages of rolling. In order to guide long strips properly through the mill they must be rolled with a slight fullness in the center. The guides are of importance only to insure that the path of successive pieces

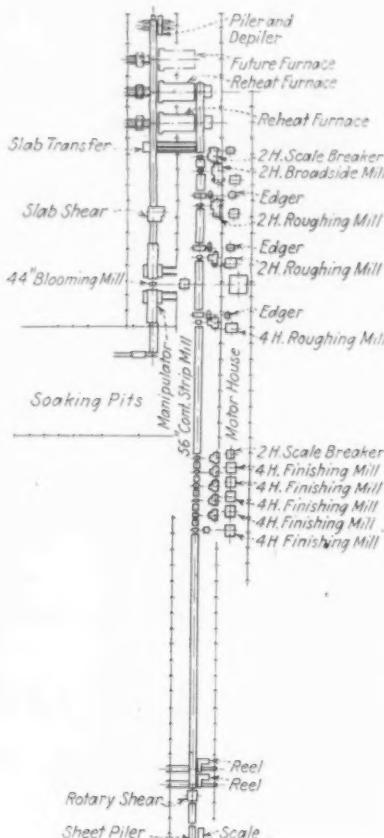


FIG. 1—Layout of a modern 56-in. hot strip mill.

*Abstract of paper read before the general meeting of the American Iron and Steel Institute, at New York, May 23.

Bars and Rods*

By S. M. WECKSTEIN
Timken Roller Bearing Co.,
Canton, Ohio

is on the same part of the roll. The control of the strip in the mill is accomplished almost entirely by the careful adjustment and shaping of the rolls.

Turned rolls cannot be used satisfactorily in strip mills. The rolls must be ground with extreme accuracy. Whether they should be ground concave or full is dependent entirely on the stiffness of the mill and is based solely on careful judgment and experience. The shape of a roll in the grinder is not the same as when it is actually rolling steel. When rolling pressure is on, the roll flattens and bends no matter how stiff it is. If both backing and working rolls are ground straight, the mill will deliver a strip full in the center. The amount of fullness will depend on the reduction, the width and the shape of the entering strip. Increasing the load will change the shape of the rolls and strip.

In cold-rolling, and occasionally in hot-rolling, local application of heat is employed to shape the rolls. Properly directed gas flames or streams of hot compounded oils are applied to the back-up rolls. The heat develops the desired contour of the rolls.

The shaping of rolls by increasing the rolling load presents a serious problem from the standpoint of bearing life. Bearings are designed to give a desired expected life under given rolling loads. A continuous slight increase in rolling loads results in a considerable decrease in bearing life. For this reason, as a protection of bearing life, it is strongly recommended that pressure recording instruments be incorporated in all four-high stands, especially in cold-



S. M. WECKSTEIN, assistant chief engineer of the Timken Roller Bearing Co., was graduated from Stevens Institute of Technology 1923 with the degree of M.E. In 1923 he joined the industrial engineering department of the Timken Roller Bearing Co., where he made a special study of the design and application of bearings in industrial equipment. In 1926 he was placed in charge of that department. In 1927 the industrial engineering and rolling mills divisions were combined and Mr. Weckstein took charge of the new department. Since that time he has been engaged in anti-friction bearing developments, particularly in the industrial field, and has specialized in the applications involved in rolling mills.

mill. In this way reductions per pass can be properly balanced so that additional loads imposed by the screws for the shaping of the rolls will not make the total rolling load greater than the recommended separating force of the mill.

While attention was focused on the manufacture of precision products from four-high mills, little development work was being done on bar and rod mills. With the introduction of knee-action springs to automobiles an immediate demand was created for precision rounds. Prevailing commercial standard tolerances were not satisfactory and the hot-rolled product coming off the mill could not be used without cold-drawing to size.

Some mills immediately tackled this problem and after considerable experimentation offered a hot-rolled product held to one-half of standard tolerances. One mill found it possible to roll to even closer tolerances but decided to accept orders only on the basis of one-half prevailing standard tolerances. The foregoing results were made possible by suitable mill arrangement, proper mill practice and proper equipment.

Mill arrangement depends entirely on range of products, size of orders, diversity of orders and size of plant. The continuous mill and the semi-continuous mill are the two general types to be considered.

The continuous mill has the advantage of low first cost and low operating cost. It is adapted to rolling large tonnages of narrow strip, skelp, flats, angles and merchant bars. It is justified in large steel plants where tonnage requirements are large and range of products limited, but is not suited to the average merchant bar plant.

In the rolling of strip the product must be accurate as to gage and width. Mill rolls can be set beforehand and roll speed con-

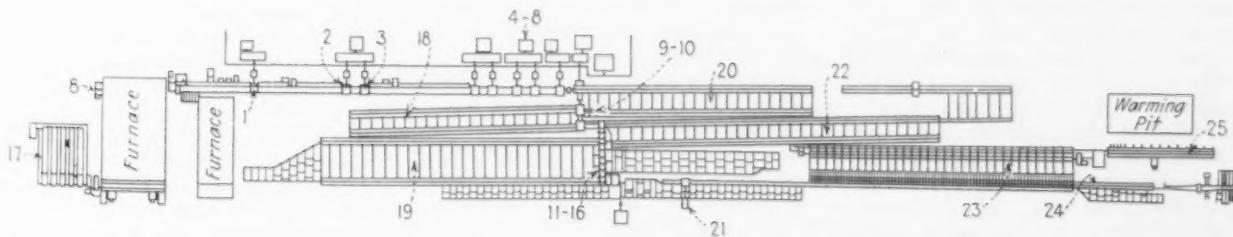


FIG. 2—Layout of 10-in. and 12-in. merchant mills. Roll stands are indicated by numbers 1 to 16; 17 indicates a charging table and skid bed; 18 is a transfer table for stands 9 to 10; 19 is the transfer table for stands 8 to 9; 21 indicates a flying crop shear; 22 is a transfer table for stands 10 to 11; 23 is a pack annealing cooling bed; 24 is an approach table to the rod reels; and 25 indicates a back shear table.

trolled to maintain proper loops between stands. Adjustment for gage can be made in the last few stands; width can be maintained by edging rolls.

When it comes to rolling rounds it is a different problem. The delivery of an accurate round from the finishing stand is dependent upon the delivery of an exact section from the next preceding stand of the mill and this section is in turn dependent upon the delivery of an accurate section from the preceding stands. In other words, the accuracy of the finished product is a function, not alone of the finishing pass, but of each preceding pass. To assure this accuracy,

then be individually adjusted to give the desired accuracy.

Proper mill practice and mill equipment are important and govern the accuracy of the finished product. Attention must be given to proper heating of billets, control of temperature during rolling, control of scale, elimination of undue stretching and twisting of material during rolling, efficient handling and rolling after the product leaves the mill, and roll design and roll mounting.

It is very important that all billets be heated uniformly; the temperature should not vary from billet to billet. Even more important, the temperature in different

be designed to enter and hold the bar or rod in a definite position relative to the groove in the roll. Delivery guide-boxes and twistlers must be equally accurate and of proper design so as to minimize the severity of the twist and not restrain the free passage of the material. Adjustable guide-boxes may be used if their design is such as to assure permanency and accuracy of the adjustment.

Accuracy of the finished product depends on the grooving and necking of the rolls. Often very little attention is paid to the necking operation. It should be borne in mind that turning and grooving roll bodies is done from the necks and the accuracy obtained depends on the accuracy of the necking. The necks should be concentric with the body and all faces should be accurate and exactly square with the neck and center line of the roll.

Grooving of the rolls is very important. The determination of the exact shape of each groove is a matter of long experience and will naturally vary with the number of passes from billet to finished product. To obtain best results, too much time cannot be spent in machining the grooves to make sure that they are accurately finished to specifications. A slight variation in machining may result in an extreme variation in the product.

Mill Housings Redesigned

Mounting the rolls in their housings is of extreme importance. Provision must be made to hold the rolls in a definite and accurate position for a maximum of time. That is, there should be no wear in the bearings sufficient to permit the movement of the rolls, either in a vertical or lengthwise direction. It is in the maintenance of this accuracy and also in the relief of the operator from the necessity of constant pass readjustment that roller bearings play so important a part. Plain bearings of the radial type often show considerable wear with consequent change in the vertical plane. Plain thrust bearings, due to the difficult lubrication problem which they present, show considerably more wear in the lengthwise direction. Roller bearings are available which do not show any wear in either direction, as compared with many types of plain bearings. By taking advantage of this feature it is possible to obtain perfect alignment and setting of rolls and to maintain this setting indefinitely. It is also possible, by proper design, to make provision on the mill for adjusting devices which will permit setting the rolls

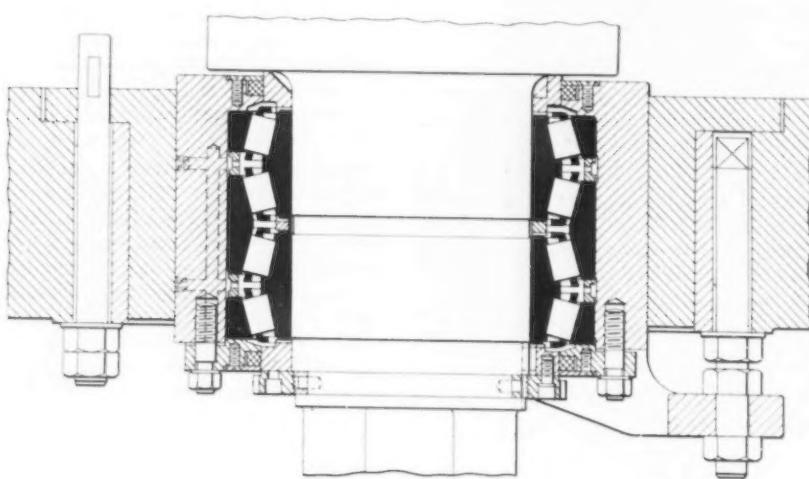


FIG. 3—Typical roll mounting. On the left side of the center line is shown the floating end of the top or bottom roll. Right side shows the fixed end.

considerable skill is required on the part of the operator in the adjustment of the sections of the various roll stands. Since the product of section area and delivery speed must be constant for all roll stands, it can be readily seen that an adjustment in section in any stand must be accompanied by a corresponding adjustment in roll speed. A section adjustment in one stand may require adjustments in some of the other stands, both in section and in roll speed. This means that the operators must be constantly controlling roll speed and section adjustments.

The semi-continuous mill is more suited to the production of high-quality products. It is easily adapted to the rolling of specialties and jobbing orders of small tonnages. These mills are usually arranged with several roughing stands for continuous rolling. Intermediate and finishing stands are arranged to permit the product rolled to run free after each pass. This means that intermediate and finishing stands are independent of each other as far as speed is concerned. The passes can

parts of the same billet should be uniform. Varying temperatures in the billet will result in different finished sections. To obtain this uniformity in temperature it is important to maintain the furnaces at maximum efficiency. Rolling and heating schedules must be arranged to assure a continuity of flow of billets from the furnace through the mill. All billets should be heated for the same length of time and should take exactly the same length of time to pass through all the stands.

In the continuous mill, temperature during rolling cannot be readily controlled and will depend entirely on the temperature of the billet leaving the furnace. This means that all billets leaving the furnace must be of exactly the same temperature to assure that all materials will be finished at the same temperature. In the semi-continuous mill, the bar or rod may be delayed on the transfer tables and thus the same desired finishing temperature obtained.

Undue stretching and twisting of material during rolling must be avoided. Entry guide-boxes must

or changing the setting by small increments in a minimum of time and without the cut-and-try method used with plain bearings. Once adjusted, the operator can be sure that the rolls will stay put and the only adjustments which he need consider are those required to compensate for wear in the roll passes. With this relief from constant readjustment of passes in the roughing stands, the roller can pay more attention to the finishing stands and produce a more accurate product.

Together with roll mounting, considerable study should be given to the design of mill housings. It is a known fact that the housings as well as other parts of the individual stands are constantly stretching and contributing to the change in the passes. For precision rolling stiffer or possibly oversize housings should be used. Careful control of the rolling loads, by the balancing of passes or possibly by reducing the work per pass and increasing the number of passes, will help considerably in the final accuracy of the product.

Much attention has recently been given to vertical mills and a number of such mills have been installed. These have been of the overhung-roll type and the full-sized roll type. At one of the plants where extremely accurate rolling has been done, a vertical mill with full-sized rolls supported in bearings at both ends and with a full complement of roll passes, has been successfully used.

The rolls in this mill are adjustable up and down so as to line up properly with the passes in the preceding horizontal stand. The rolls are also adjustable sidewise to line up with the passes of the preceding stand. In addition a very fine vernier adjustment is provided for moving the rolls longitudinally with respect to each other so as to obtain accurate pass alignment. The finished product taken off this vertical mill is held to less than one-third of standard commercial tolerances.

New Mill Suggested

Some experimenting has been done on the use of anti-friction bearing thrust units in connection with ordinary plain bearings or composition bearings. The theory behind this work has been that radial wear could be materially reduced by improved lubrication on plain bearings or by the use of composition bearings. The anti-friction thrust units are used to maintain the endwise position of the rolls. The units are provided with an accurate micrometer end-

adjustment which makes it possible to accurately line up the passes in the rolls. Complete results on the use of these units are not available. It has been found that it is not sufficient to use such units only on the finishing stand. They must also be used farther back in the mill and are consequently applicable only in continuous mills. It was found to be a difficult job to apply a thrust unit to a roll with the required accuracy. Due to the high speed of the mill a small amount of misalignment caused considerable run-out with consequent pinching of the bearings in the thrust units. It was further found that the condition of the wobblers and pods had to be watched carefully. Worn wobblers and pods caused end thrusts considerably in excess of the capacity of the bearings used on the job. Such a condition can undoubtedly be remedied by the use of universal couplings.

Another suggestion for a precision mill is that of a backed-up mill which the designer describes as follows:

"The four-high bar or rod mill stand is unique in that the rolling pressure is to be used as a means to prevent endwise motion of the work rolls. The pressure will force the convex surface of the work roll into the concave surface of the back roll, resulting in a wedging action between the two rolls,

Discussion

thereby preventing any relative endwise motion between them.

"Similarly, one-half of the rolling load will be transmitted through the inner race of the double row tapered bearing on the front backing roll neck into the conical rollers and through them into the outer races. All these actions have the same wedging effect, and consequent prevention of relative endwise motion.

"The amount of variation in finished bars or rods when hot rolled in mills of this design, of course, will be dependent to some extent upon the amount of the variation in temperature and in the cross-section of the bar delivered to these stands. The effect of endwise motion of the rolls probably has not been given the consideration it deserves.

"The strength and rigidity of mills made to this design and the prevention of endwise motion of the work rolls should undoubtedly result in a very considerable reduction in hot rolling variations."

To the writer's knowledge a mill of this type has not been built. It would be interesting to see the results which would actually be obtained.

Since the entire industry is now studying this problem of precision rolling of bars and rods it may be expected that marked developments will be made in the near future.

By EARL C. SMITH

Chief Metallurgist, Republic Steel Corp., Youngstown

WHEN a new mechanical development appears, in any field which had established its economic limitation as definitely as did hot rolling of steel, a series of related industrial affairs is disturbed. During the period of experimental operation the economic limitations of the new development are not known. Consequently, for a considerable period of time, much conflict between the old and new methods exists. But eventually a new equilibrium is reached which has such parts of the old method as can remain, that part of the new which has demonstrated its ability to compete, and the new developments which represent the commercial answer to the competitive threat.

The mechanical limitation in maximum thickness of strip and sheet and also plate would indicate that the precision mill should dominate the flat-rolled steel industry.

In the hot-rolled bar industry, at

its present stage of development, no such dominance is evident. The major dimension of such bar products exceeds that of strip by a very wide margin. A simple section, such as 1-in. round, so far multiplies the problems of reduction, rolling, cooling and contour, as to make the mill problem infinitely more difficult than that of rolling strip, even when such strip is less than 0.100 in. thick. Each bar size rolled becomes a specific problem, requiring adjustment not only of the finishing pass but of the mill behind which delivers the partially shaped product to the final stand.

The competitive branch of industry which has been most concerned with the precision bar is the cold-finishing group. This industry faces a peculiar problem. When the hot bar produced by the usual hot rolling is of such physical characteristics that it can be further processed without anneal no hot-rolling device, now known,

can furnish the economic answer of precise size in small lots of varied analysis required by the user. The hot-rolling device at best can supply but a limited range of sizes in relatively large quantities. The producer who elects to limit his economic spread in a very narrow field forces the problem of cost of carrying the full range of sizes to some other branch of the industry. Consequently, the jobber should bridge the gap between the present bar mill schedule and the user's immediate requirements.

The cold-finished bar industry occupies the dual position of jobber and producer of special size and shape requirements. Its economic position has been disturbed by the hot-rolling mill from two angles. During the depression small lots of a few bar sizes have been supplied by selection from hot-rolled bars. This function of a special jobber hardly belongs to the major producer. A further production of hot-rolled product to special tolerance with additional selection has made possible the shipment of some tonnage of product that is directly competitive with the cold-finished products. This is especially true under cer-

tain finishing conditions such as pickling and polishing during straightening operations.

Considering that the important function of a hot rolling mill, producing bars, is to reduce the billet to a bar at the most economical rate possible, one is forced to recognize that it may be more economical to fill an order for specific sizes and lengths from a material which has had additional operations. The problems of shrinkage from rolling heat, end to end variation of finishing temperature and many metallurgical requirements, would indicate that the hot mill is not the best place to produce accurately sized small lots of simple steels.

One must recognize that progress in any industry comes at some price, and any attempt to block sound economic development is doomed a failure. One must also consider whether that fundamental principle, of backed-up work rolls and anti-friction bearings, which is so dominant in the flat rolled industry, is the proper answer for the problems of hot rolling and distribution of bar mill products.

must be made, bars must be constantly gaged as delivered from the mill, and billet temperatures must be kept as nearly constant as practicable. These are all factors tending to reduce the production rate of the mill.

Normally, the product of the bar mill is finished and ready for shipment after cutting to length or coiling. This is not true, however, of the precision product, as it is necessary to measure each bar at a number of points along its length to insure that it comes within the specified dimensional limits. Further processing of pickling, oiling and finish straightening, if required, necessitates additional checking of size to insure that the straightening operation has not reduced the size below allowable limits. Not only does this inspection add cost to the product, but the increased amount of rejections for out of tolerance bars decreases the product yield and adds more to the product which is shipped.

While it is feasible to closely inspect cut length bars for size, it is practically impossible to measure coiled bars at a sufficient number of points throughout the coil to insure the size accuracy required which, taken in conjunction with the effect of the coiling action itself upon the shape of the bar, makes it extremely difficult to produce coiled precision bars.

When it is recognized that the production of precision bars involves increased operating as well as equipment costs, we can readily realize that the precision product, because of its higher cost, will not replace the standard hot-rolled merchant bar as we know it, nor can it replace cold-drawn bars where extreme accuracy of size and finish are essential. There is undoubtedly a field for this intermediate product which will develop as the mills and their customers become more familiar with its advantages as well as its limitations.

In the early days of precision bar production some of us thought of it as a natural refinement in bar mill rolling practice, but the demands now made with respect to both size limitations and surface finish have added so much to its production costs that it is in a class entirely apart from its parent, the standard hot-rolled merchant bar.

Discussion

By J. T. SOMERS

Vice-President and General Manager
Wyckoff Drawn Steel Co., Pittsburgh

M R. OBERG has pointed out that the production of precision bars involves additional operation as well as equipment costs and expressed the opinion that they

would not replace the standard hot rolled merchant bar nor can they replace cold drawn bars where accuracy of size and finish is essential. The advantages of cold

Discussion

M R. WECKSTEIN'S very excellent paper covers his subject so thoroughly that I fear there is little of general interest that I can add.

However, I should like to bring out another angle of the production of hot-rolled material to precision dimensional control, which Mr. Weckstein has not touched upon, namely, that of production rates and their effect on production costs.

It is undoubtedly true that the modern, well-designed continuous four-high strip mill, by its very design, is inherently suited for accuracy and uniformity of gage. This high degree of refinement and surface of finished product is not obtained, however, without additional operating cost, as the ever-increasing demand for still greater accuracy in gage and perfection of surface requires very frequent roll changes. One of the larger strip sheet mills, I understand, changed over 1000 rolls in a recent month's operations. Such frequent roll changes obviously add materially to production delays and production costs. While the quality of rolls obtainable today is vastly superior to that of a few years ago, I believe that it is still true that the exacting require-

drawn bars over precision bars are not confined merely to accuracy, surface condition and straightness. Cold drawing is the only operation, other than annealing, that creates a marked improvement in the physical properties of the hot rolled bar. The tensile strength of the hot rolled bar is increased from 15 per cent to 25 per cent by cold drawing and the yield point is increased from 40 per cent to 50 per cent.

Cold drawing radically reduces the necessity of extra machining operations and eliminates considerable heat treating. Cold drawing also imparts a degree of density that has a decided influence on that all-important factor—machinability—of practically every grade of steel.

Comparative tests on the same material machined in both the hot rolled and cold drawn condition show that from 15 per cent to 20 per cent greater production can be obtained in machining cold drawn steel in automatic screw machines. Machineability and tool life are definitely related and one of the greatest enemies to fabricating tools today is soft, mushy structured bars that have a tendency to tear when subjected to machine operation rather than cut to a smooth, bright finish. The result of such condition is a poor machined finish, torn threads and shortened tool life between grindings. The increased density developed by cold drawing has a definite tendency to minimize this condition, resulting in increased tool life.

The cold drawn bar industry has not been immune from competitive conditions prevailing the last five years and has made great strides in the mechanization and refinement of its processes resulting in a greatly improved product.

Comparing the two products—precision rounds versus cold-drawn bars—the former shows up very poorly, when all the advantages of a cold drawn bar are given full consideration, as even after resorting to additional processing, such as pickling, machine straightening and special selection, the precision rounds have inherent disadvantages for most applications where cold drawn bars are used.

The cold-drawn bar industry is one of the country's largest consumers of hot-rolled bars and is very familiar with the limitations of what even the precision hot-rolled bar offers. J. A. Claus, chief engineer of the Great Lakes Steel Corp., Ecorse, Mich., has definitely gone on record that precision rounds are properly the product of cold drawing. His opinion seems to be unanimous whenever this subject is discussed.

OBITUARY

HENRY F. WANNING, a director and member of the executive committee of the Farrel-Birmingham Co., Inc., Ansonia, Conn., died on April 28. He was born in Webster, Mass., on March 30, 1846. At an early age he moved to New York, where he secured work with the New York Steel Co. He became identified with the Birmingham Iron Foundry in 1865. He was successively made secretary, treasurer and vice-president. He was elect-



H. F. WANNING

ed president in 1891 and continued in that office for 37 years, until the company's merger with the Farrel Foundry & Machine Co. in 1927.

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J. D. FIRMIN, since 1925 Philadelphia representative of the Rollway Bearing Co., Inc., Syracuse, N. Y., died on April 22. He was graduated from Purdue University and was for many years identified with the Niles-Bemont-Pond Co.

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MAURICE I. JOHNSON, vice-president of the Gisholt Machine Co., Madison, Wis., died May 13, aged 58 years. He was the son of the late John A. Johnson, founder of the concern, and brother of Hobart S. Johnson, now president. Mr. Johnson was born in Madison and after his graduation from the college of engineering of the University of Wisconsin entered the Gisholt works. For several years he also studied at the United States Military Academy at West Point. Aside from his duties as an officer of the company he gave most of his attention to the management of the Gisholt foundry.

A. J. BATES, founder and president of the Bates Expanded Steel Co., East Chicago, Ind., died May 8 at Miami, Fla. He had moved there only two months ago. He was a native of Chicago.

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ANDREW J. MALONEY, president of the Philadelphia & Reading Coal & Iron Co., died on May 21 at his home in Merion, Pa. Mr. Maloney was born Feb. 12, 1884, in Girardville, Pa., and spent the first 16 years of his life in Schuylkill County, Pa. Following a short law course at Temple University at Philadelphia, Mr. Maloney became affiliated with a cement company after which he became vice-president and sales manager of the Royal Colliery Co. which was later merged with Wilmington & Franklin Coal Co. On Oct. 11, 1927, he was elected president of the Philadelphia & Reading Coal & Iron Co.

Tool Steel Chart Simplifies Selection

PRACTICALLY all of the many thousands of different kinds of tools can be classified into nine groups. These nine groups form the basis of a large wall chart just issued by Carpenter Steel Co., Reading, Pa. This chart will be distributed free to all American tool steel users who apply for it.

The chart designates the correct uses of oil-hardening, water-hardening and red-hard steels. Each major division has subdivisions which facilitate the correct selection of a brand of steel which will give maximum performance for any operation desired.

Reed to Address Steel Institute

FORMER Senator David A. Reed of Pennsylvania will be the principal speaker at the banquet of the American Iron and Steel Institute, Hotel Commodore, Thursday evening, May 23, following the forty-fourth general meeting of the members of the institute that day.

Prof. Stephen Leacock, economist and humorist, of McGill University, Montreal, will also make an address.

Eugene G. Grace, president, Bethlehem Steel Corp., and president, American Iron and Steel Institute, will act as toastmaster at the banquet.



Gear Makers Hold Comprehensive Meeting

A GENEROUS program covering both trade and technical topics was provided for the 19th annual meeting of the American Gear Manufacturers Association, held at the Penn-Lincoln Hotel, Wilkinsburg, Pa., May 14 and 15. In addition, there was a meeting of the Gear Manufacturing Industry, at which the code authority through its chairman, H. H. Kerr, president, Boston Gear Works, presented its report.

Election of officers resulted in the naming of A. A. Ross, engineer, General Electric Co., West Lynn, Mass., president of the A.G.M.A. to succeed John Christensen, president Cincinnati Gear Co. E. S. Sawtelle, vice-president, Tool Steel Gear & Pinion Co., Cincinnati, was elected vice-president, and J. Harper Jackson, secretary, Pittsburgh Gear & Machine Co., continues as treasurer. J. C. McQuiston, Wilkinsburg, Pa., is manager-secretary. L. R. Botsai, Westinghouse Electric & Mfg. Co., Pittsburgh, and J. H. Flagg, Watson-Flagg Machine Co., Paterson, N. J., were elected to the board of directors.

Favors Abandoning Codes

Resolutions recording the association's opposition to the enactment of legislation such as proposed by the so-called Wagner Labor Disputes Bill, and to any further shortening of working hours by legislative enactment were passed at the last session of the meeting. Another resolution recorded the association as favoring the abandonment of NRA codes on June 16, when the existing statute expires. The resolution points out that the gear industry was one of the first to submit its code to the authorities at Washington in 1933 and has cooperated to the fullest possible extent in carrying out the provisions of its code. It believes, however, that the codes have now served their

useful purpose and that their abandonment at this time will be decidedly in the interest of further expediting recovery. A copy of these resolutions will be forwarded to the chairmen of all Senate and House committees concerned and

above 1931, the year selected to represent 100 per cent.

Trend toward factory production of homes was pointed out, and in this connection Mr. McQuiston said that the factory fabrication should bring increased demands for gears. Increasing tendency toward reciprocity in buying and selling must be reckoned with in national and international trade, he said in another part. To hold a leading position we must constantly develop new ideas, as we have in the past. Failing to do that, business sooner or later will be reduced to a reciprocity that is little better than a trading of goods. We will come into our own again when and if there is developed acceptance of a program of modernization of machinery approaching that of the automobile, he said: "when there will be reflected visioned determination and courage in advertising and promotion of machinery that will create once again a desire to be up-to-date and progressive."

In this connection Mr. McQuiston cited the recent *American Machinist* survey of obsolete equipment, pointing out that 65 per cent of the metal working equipment in the United States is now more than 10 years old, as compared with 44 and 48 per cent for the years 1925 and 1930, respectively. The *American Machinist* predicts, he stated, that a revival of the spirit of machinery modernization that prevailed from 1925 to 1929 would spell recovery in the next five years. More of the daring leadership of the days gone by, encouraged by the Government, was emphasized as a present-day necessity.

The annual banquet, with John Christensen, president, Cincinnati Gear Co., and retiring president of the A.G.M.A. as toastmaster, and J. H. Van Deventer, editor, THE IRON AGE, as the principal speaker, was well attended.



A. A. ROSS—President,
American Gear Manufacturers Association.

to all Senators and members of the House of Representatives.

Discusses Trends

In an address on "Trends," J. C. McQuiston, manager-secretary of the association, discussed a number of general factors, such as population changes, education and training, international trade and others that contribute to shifts in business and industrial trends. Specific trends in the gear manufacturing industry as reflected from data on sales, shop payroll, hours of work and invested capital were also interestingly outlined. A chart of sales of industrial gearing showed that the first four months of 1935 are 10 per cent

Mr. Van Deventer's address on "Where Do We Go From Here?" was followed by a one-act play on "What Are We Going To Do About It?" The cast of the play was drawn from the dramatic class of the Wilkinsburg High School.

In outlining the current economic and political situation, Mr. Van Deventer showed that dictated economies, such as represented by the so-called New Deal, date back to 4000 B. C. in Egypt, and that political freedom and economic dictatorship cannot live side by side. He pointed out that where the present Administration's program tends toward a managed economy, with a shackling of enterprise, initiative and invention, industrialists should organize through their trade associations to resist it. He advocated action by districts, as well as by association groups, in keeping informed of legislative proposals affecting industry, and in promptly informing their representatives in Congress of their convictions relating to doubtful proposals.

The play centered around the president of a gear manufacturing company who had, until the end of the play, ignored trade association appeals to enter the list of objectors of undesirable pending legislation.

The annual meeting of the Gear Manufacturing Industry mentioned at the beginning of this report included a well-prepared address on "Industry and/or Government," by Neal W. Foster, Boston Gear Works, Inc., and a former deputy administrator of NRA.

"It is a question," said Mr. Foster, "whether this Administration or any that succeeds it, can drop the partial control of business brought about by the National Industrial Recovery Act. We are facing two alternatives, either working with Government as 'Industry and Government' or fighting to maintain industry against interference by Government.

Individual Viewpoints Must Be Rearranged

"It is such sane industries as the gear manufacturing industry that can help frame the future national business policies. Individual viewpoints must be rearranged to meet new conditions; then, through the conduct of your industry set an example. Make yourself heard, not in anti-legislative movements alone, but in offering sound suggestions for real legislation, or for interpretations of existing regulations."

In speaking of trade associations, Mr. Foster pointed out that the more cooperation an association receives from its members, the



E. S. SAWTELLE—Vice-president, American Gear Manufacturers Association.

more valuable it may become in influencing future constructive legislation. When the members of an industry really agree among them-

selves they can always make themselves heard.

Mr. Kerr in reporting for the Code Authority gave figures indicating a 33 per cent increase in sales by the gear industry in 1934 as compared with 1933. The payroll in 1934 was \$3,845,608 against \$2,775,448 in 1933, and the average pay to employees 65c. an hour as compared with 62c. in 1933. The number of employees in 1934 was 3200 as compared with 2600 in 1933. Shortage of skilled mechanics is beginning to be felt in the industry, and in this connection Mr. Kerr indicated that the training of suitable mechanics was one of the basic jobs ahead of the gear industry. In discussing the general situation Mr. Kerr said: "Our industry and all industry is on the fence today, and it is up to you whether you will cooperate for the industry as a whole and for your individual benefit, to take a determined stand on what you expect from your industry, as well as from its members, or whether you will sit idly by until the Government has regulated your business and from which you will have no recourse."

Gear Standardization Committees Active

REPORTS of the several subcommittees of the A.G.M.A. general standardization committee, which is now headed by T. R. Rideout, engineer, Westinghouse Electric & Mfg. Co., reflect progress in the establishment of technical standards and recommended practices, which for many years has been an outstanding activity of the association.

Three of the 14 subcommittees, namely the tooth form, inspection and electric railway gearing, have completed their programs. The last named committee has presented a complete recommended practice covering all phases of the manufacture of electric railway gearing on which standardization is possible or practicable. The complete recommended practice contains the combined individual practices for each subject, new and revised, and as a whole supersedes all previous separate issues.

The metallurgical committee, under the chairmanship of Chester B. Hamilton, Jr., president, Hamilton Gear & Machine Co., Toronto, Canada, has been working on recommended practice covering cast iron for gears. For the general run of cast iron gears for ordinary purposes the A.S.T.M. tentative specification A-48—32-T, class 35, 35,000 lb. minimum tensile

strength, has been suggested. A view expressed in the discussion was that the 35,000-lb. iron was suitable for washing frames and smaller gears, but that other specifications should be provided for higher duty gears, where additional strength may be obtained from alloys or steel mixtures.

Revision of existing recommended practice for the design of worm gearing, using existing hobs; and a new recommended practice for design of new worm gearing for which tools are required are on the program of the worm gear committee, the chairman of which is T. R. Rideout. A series of notes covering the design and manufacture of worm gearing has been worked up in rough form.

Material Being Gathered for Gear Standards Book

The library committee, through its chairman, M. T. Schumb, Boston Gear Works, Inc., called attention to the recent publication of two sections of the Manual of Gear Design, prepared by Earle Buckingham, professor of mechanical engineering, Massachusetts Institute of Technology, and published by the Industrial Press, New York. These manuals bear the monogram of the A.G.M.A. The first section

is devoted to eight place tables of angular functions and tables of involute functions, radians, gear ratios and factors of numbers, and the second section contains standards, formulas and tables for the design of spur and internal gearing. The committee urges placing of orders for the manual through the association's secretary. Preparation of data accumulated by the committee for inclusion in the A.G.M.A. Book of Standards is expected to be completed before the next annual meeting.

The nomenclature committee, D. T. Hamilton, engineer, Fellows Gear Shaper Co., is working on gear dynamics, and the spiral bevel gear committee, headed by F. E. McMullen, Gleason Works, is revising its recommended practice, including tooth loads and stresses. The keyway committee, R. B. Zerfey, Tool Steel Gear & Pinion Co., chairman, has completed its program except as to internal involute splines. Work on a tooth load-formula is being continued by the helical gear committee, which is headed by Ira Short, Westinghouse Electric & Mfg. Co., South Philadelphia. A table of maximum sprocket speeds and of chain velocities for various numbers of teeth in the smaller sprocket was submitted by G. D. Bartlett, chairman of the association's sprocket committee.

Present activities of the joint A.S.M.E.-A.G.M.A. special research



R. BOTSAY—Member of board of directors, American Gear Manufacturers Association.

committee on gears was outlined by Prof. Earle Buckingham. They include a series of tests to determine the nature of different types of wear, the preliminary work being confined to surface fatigue under pure rolling contact. Heavy load tests have been run on nitrided steel, cast iron, semi-steels and leaded brass. Photographs of tested specimens which showed microscopic failure at 150,000 to 300,000 cycles and flaking at the

end of 2,000,000 to 5,000,000 cycles were interestingly discussed. The tests are expected to provide highly useful quantitative data as to safe loads for different types of contacting surfaces and wear. It was also reported that tests of helical gears on the Lewis Machine will be begun as soon as the necessary 16-in. diameter, 2½-in. face gear, and a series of mating pinions become available.

The technical part of the A.G.M.A. meeting also included six interesting papers, the titles and authors of which are: "Inspection Methods That Give a New Conception of Gear Accuracy," by S. O. Bjornberg, Illinois Tool Works; "Crossed Axis Shaving of Spur and Helical Gears," by R. S. Drummond, National Broach & Machine Co.; "Methods of Checking Gears," by Robert Beardsley, Jones & Lamson Machine Co., and D. T. Hamilton, Fellows Gear Shaper Co.; "Discussion of Proposed British Standards Specifications for Worm Gearing," by Prof. Earle Buckingham, Massachusetts Institute of Technology; "Modern Heat Treating Methods and Their Application," by Jordan Korp, Leeds & Northrup Co.; and "Seeing Goes to Work in Industrial Plants," by E. D. Altree, incandescent lamp department, General Electric Co. It is planned to include abstracts of these papers in forthcoming issues of *THE IRON AGE*.

Canal Committee Chairman Defends Beaver-Mahoning Project

THE United States Board of Engineers, after thorough surveys, found the Beaver-Mahoning canalization project to be economically justified and necessary if 800,000 people are not to lose their employment and their homes, and if the district is not to dry up, according to J. C. Argetsinger, Youngstown, chairman, Canal Committee. The Chief of Engineers and the Secretary of War recommended it to Congress, and the House of Representatives unanimously adopted it after exhaustive hearings at which these same opposing railroad and steel interests consumed days in presenting their objections. Mr. Argetsinger's statement in part follows:

The Beaver and Mahoning valleys are congested areas of unemployment, with nearly 50 per cent of their population on private and Federal relief

rolls. This improvement would start in 30 days, would employ 5000 men taken from Federal relief and more than 78 per cent of the cost would go into labor costs, as reported by the Government engineers. These engineers also say that this improvement is one of the most deserving and outstanding waterways now being considered, as it would not only afford immediate employment to many thousands on relief but would preserve and perpetuate employment over the ensuing years to scores of thousands of workers who otherwise are threatened with permanent loss of their jobs and their homes.

The Ohio Valley Association asserts this waterway would benefit a few interests only. As a matter of fact petitions signed by 140,000 persons in these valleys have been addressed to the Senators and the President, urging its immediate construction. The whole population of 800,000 people in the valleys are demanding this relief

and they know it will benefit millions of people in the United States.

The improvement harmonizes completely with the policy of Congress, as reported by the Chief of Engineers and declared by Congress in its inclusion in the Rivers and Harbors Omnibus Bill. The estimated cost computed by the United States District Engineers is \$25,000,000 and to this he added 20 per cent as a "margin of safety," yielding \$30,000,000. The Board of Engineers added another 20 per cent as a further "factor of safety," producing the estimated \$36,000,000. The Chief of Engineers states figures obviously are high and the estimated savings are computed substantially below what he anticipates to develop.

The Beaver and Mahoning valleys have paid more than enough income taxes in 20 years to build the Ohio River system, with no direct benefit to themselves. In 25 years, after the Ohio River System was developed, water tonnage in Pittsburgh increased from 14,000,000 tons to 45,000,000 tons, while in the same period railroad tonnage in and out of the Pittsburgh District, per railroad figures, increased from 50,000,000 tons to 174,000,000 tons. These figures make obvious the selfish attitude of the opponents and refute the statements they have made.

New Deal Condemned at National Metal Trades Convention

THE New Deal, the NRA and the various economic, industrial control and social legislation policies of the Roosevelt Administration were vigorously attacked by speakers at the 37th annual convention of the National Metal Trades Association held at the Hotel Cleveland, Cleveland, May 15 and 16. Practically the entire speaking program was devoted to flaying various phases of the New Deal activities of the Federal Government and several speakers expressed the belief that the New Deal has delayed rather than hastened recovery.

That the NRA be allowed to expire June 16 instead of having its life extended was demanded in resolutions which also insisted that no similar legislation be enacted. Resolutions also were adopted condemning the Wagner labor disputes bill, the social security bill and the Black 30-hr. week bill. The pending banking bill also was sharply criticized, although it was not referred to in the resolutions.

The resolutions mentioned that the gain in business has been largely in the consumer goods industries and declared that there is a huge potential demand for durable goods but there must be a return of confidence before there is revival in activity in the durable goods industries.

Referring to the NRA the resolutions said that business men are now conscious "of the fundamental error of the underlying theory as well as the practice of the statute which in reality seeks to revive the medieval guild system."

The Wagner, the social security and the Black bills, the resolutions said, were "in no sense legislation to stimulate a recovery; rather they are to be classed as so-called reform legislation certain to delay if not to prevent recovery and to increase unemployment."

On social security the resolutions said:

"We believe social security can be established more efficiently under plans which permit the setting up of individual company reserves, thereby eliminating the possible abuses of a State-operated or controlled plan."

Referring to the Wagner bill the resolutions declared:

"It warrants determined opposition to its passage by industry of this country, prescribing as it does so much that is inimical to the conduct and cultivation of peaceful relations, while prescribing the regimentation of the wage earner, which as yet is without adequate comprehension on his part."

"The Black bill, proposing vastly to increase the costs of production and upset the balance of economic society," said the resolutions, "warrants the vigorous opposition of employer and employee alike."

The association indicated its reaction to some of the critical comments about business and business men that have come from political sources by concluding its resolutions with the following paragraph:

"Speaking as business men, we resent cynical comment on the part

of any political servant as to the value of business criticism, when made in sincerity, filled as it is by love of a common country."

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President Sellers Deplores Rise in Labor Disputes

THE attack on the NRA was launched by Alexander Sellers, president of the association, in his annual report. Referring to the uncertainty that prevailed a year ago when the association met in New York, he said that today the prospect is no less clouded, with legislation enacted and in prospect which must obviously increase the risks and costs of business and industry.

The period of nearly two years since the inauguration of NRA has been marked by severe industrial strife. However, less than 1 per cent of the members of the association had suffered from labor disputes during the past year.

"This is a record we may be justly proud of," declared Mr. Sellers. "In my opinion it is due in large measure to the educational activities the association has carried on for a great many years and which serve to develop sound employer-employee relationships."

During the first nine months of last year an average of 133,000 employees per month went on a strike in all industries. The total number who struck during this period was 1,197,334 as compared with 812,137 for the entire year of 1933. Union leaders have called out thousands of men during these trying times, said Mr. Sellers, to force the closed shop on industry, in the hope of being able through Governmental mediation to effect a compromise of their demands, or to create propaganda for legislation in their favor.

Enactment of the NRA was regarded by the American Federation of Labor as an invitation to unionize all industry. However, the federation still represents less than 10 per cent of the working population.

"Not long ago," continued the speaker, "we asked each of our members for a reply to this ques-

Officers and Councilors Named

FOLLOWING custom the president and vice-presidents were reelected for another year and the treasurer was also reelected. The officers are: President, Alexander Sellers, president of William Sellers & Co., Inc., Philadelphia; first vice-president, Charles H. Strawbridge, vice-president, Goodman Mfg. Co., Chicago; second vice-president, N. W. Pickering, Farrel-Birmingham Co., Inc., Ansonia, Conn., and treasurer, Harold C. Smith, treasurer, Illinois Tool Works, Chicago.

The following councilors were elected for two years to serve with six who hold over: Philip Morgan, Morgan Construction Co., Worcester, Mass.; Roe S. Clark, Package Machinery Co., Springfield, Mass.; W. L. Hinds, Crouse-Hinds Co., Syracuse, N. Y.; K. T. Keller, Chrysler Corp., Detroit; J. R. Kinney, Kinney Mfg. Co., Boston, and David Wilson, Willys-Overland Co., Toledo.

After adjournment a meeting of the council was held at which the following appointive officers were renamed: Commissioner, Homer D. Sayre, Chicago; national secretary, H. S. Flynn, Chicago, and Eastern representative, L. A. Stringham, New York.

tion, 'Do you favor a continuance of the NRA?' I believe you will be interested in an analysis of the answers received from 623 members.

"Four hundred seventy-nine or 76.7 per cent were emphatically opposed to continuance of the Act.

"Fifty or 8 per cent favored its continuance—of these 50 a substantial number explained their vote as due to fear of substitute legislation more objectionable than the present NRA.

"Ninety members or 14.7 per cent of those voting advocated the enactment of a modified law. The majority of this group were of the opinion that age or hour provisions, in some cases both, should be retained to the exclusion of the remainder of the law.

"There was almost universal agreement in condemnation of Section 7a.

"In my opinion, the NRA is unsound in principle and incapable of enforcement, as our system of government is quite unsuited to the practice of regimentation. This law has, I believe, seriously hampered the process of recovery. At a time when prices had reached a level which clearly indicated the beginnings of a natural stimulation of demand, prices were artificially raised by the NRA and, following a temporary and hectic increase in business activity, natural budding demand was smothered by the artificial rise in costs, the result of which no man could foresee.

"As a result reemployment of workers has been seriously delayed, strained employer-employee relationship has developed, industrial war has been stimulated, private enterprise smothered by unwarranted intrusion into its field by Government and the fear of still further intrusion, and the threat of economic death to those who declined to accept the rulings of a Government board armed with extra-legal powers and attempting the exercise of a control over industry in defiance of our Constitution and system of government.

"That portion of the NIRA which most nearly affects the activities of our association is, of course, Section 7a. We cannot hope for peace in the industrial field until final and authoritative answer is given to this question, 'Is Section 7a a mandate for the closed shop?'"

Condemns Wagner Bill

Discussing pending legislation of vital interest to American industry, Mr. Sellers declared that the Wagner labor disputes bill is one of the most unfair and most

damaging pieces of legislation ever introduced in the American Congress. He pointed out that while the bill makes it unlawful for an employer to interfere with or influence in any way the formation of a labor union or his employees' membership therein, there is nothing in the bill to control the methods used by labor leaders to gain control in a plant.

The Black 30-hr. week bill he characterized as almost equally obnoxious. Industry, he said, could not support so impossible a burden. He also referred to the burdens that the social security bill would impose on industry and declared that the proponents of this program admit that it is experimental.

"Industry has not familiarized itself with the details of this proposed measure," he said, "and its grave implications, and consequently is not making a determined enough effort to defeat this measure. If the principle of Federal assistance in this field is once established, the ultimate burden upon industry would be terrific."

Too many have endorsed policies of the New Deal, said Mr. Sellers, not because of their approval of these policies, but in spite of their disapproval, because they believe that certain of these policies would have been of benefit to them as individuals.

The Machine, the Workman's Best Friend

"The American workman today is receiving a larger percentage of the rewards of human activity than ever before in our history, and at a smaller cost to himself," said Mr. Sellers in answering "share the wealth" talk. The superior minds responsible for the invention and development of humanity's tools deserve the credit for these social benefits.

"Let our people beware of false prophets who would turn them against their benefactors. It is our duty, as business men, to enlighten our employees concerning these truths. I have confidence in the sound common sense of our people and that, if given the opportunity, they can discern the truth.

"The American system and American business made America. American business can lead the way to prosperity again, given the opportunity. This opportunity must come from the American people, but they must first be acquainted with the facts. Let it be the duty of each one of us to present these facts, insofar as we may, to the end that self-seeking radicals be destroyed and not the people whom they would deceive."

Danger of a serious shortage of skilled workmen in the metal trades was pointed out by Mr. Sellers in discussing some of the departmental activities of the association during the year. He said that the study of employment by the industrial education department has brought the association to the realization that it is being faced with this shortage. This condition has resulted chiefly because of the restricted apprenticeship training activities during the depression. Certain localities already have reported a serious shortage of tool makers, die makers and highly skilled all-round mechanics. An estimate shows that industry has lost between 30 and 40 per cent of its skilled workmen since 1929.

James A. Emery Derides Political Fairies

IKENING political New Dealers to fairies and declaring that political fairies rush in where angels of good sense fear to tread, James A. Emery, counsel, National Association of Manufacturers, discussed some of the country's political and economic problems in a paper captioned "Facts and Fairies."

"Our fairies," he said, "no longer hide in the grass or live with the gnomes. They are found in public places, for they no longer seek concealment. Their voice is that of the radio and they are no longer mysterious, for their field is practically political rather than ideally romantic. They no longer assume the humble shape of disinherited princes or wandering beggar women. They take the alluring form of a senator from Utopia, a padre with a divining rod, or, perhaps, a versatile practitioner who assumes protean official shapes, or become professors who know all the answers. Temporarily, they may even live in a Cabinet. Wherever they appear or whatever their shape, they preach alchemy and admit possession of the alkahest. They rub not a lamp but a ballot box, and their kingdom is as boundless as that of Prester John."

"But political fairies, like those whom Barrie brought to life, live only by faith. When Tinkerbell Nira, the fairy of Recovery, lay gasping on the Senate steps, it was the versatile Peter Pan of Richberg who pled for the waving of business handkerchiefs to save the elfin life. Sometimes telegrams fall on wavering politicians like snowflakes, warming the cold shoulders of Grimm's lost orphans. They often beoken the same fairy

faith. For they may be responses to the belief that governments have secret sources of revenue and can give what they do not possess. Political fairies, however, vanish before the ogre of facts. They live forever in the vivid imagination of those who escape the realities of life and would live, as the insects, among pillars of gold and capitals of silver, to sleep in a roseleaf, to be awakened by a sunbeam, bathe in a dewdrop and fall to eating their bedclothes."

Dropping his allusions to fairies, Mr. Emery discussed our system of Government with constitutional limitations which were intended to preserve individual liberty. Yet, he said, you hear popular voices sneering, deriding and condemning limitations upon official authority.

Turning then to the legislative program pending, Mr. Emery said the 30-hr. bill would create work by arbitrarily prohibiting every workman in the United States from disposing of more than 30 hr. of his work or service. It would increase costs and multiply sales resistance and most of all it would establish a plenary and arbitrary Federal control of all the delicate and complex interrelations of the productive life of the nation.

"The Senator from New York," he continued, "would create a permanent labor board to regulate by prohibitory administrative orders and govern by Federal injunction, against the whole philosophy of its proponents, every local employment relation. It would grant to a board, in vague terms that would stimulate disputes and multiply litigation, greater power than has ever been proposed for any court. It demands collective bargaining without collective responsibility. Its author supported an anti-lynch law for the alleged benefit of persecuted blacks. He recommends a policy that would operate as a lynch law for intimidated whites.

"These things and more are declared to be the demands of emergency, but emergency creates no new authority, though it may justify the exercise of an existing power in terms which would not otherwise be justified. But we are confronted now with an emergency in business and employment which cries out for prohibition against the enactment of legislation stimulating antagonism and disputes between employer and employee, limiting the earning power of wage earners, increasing the cost of living, imperiling the national credit by indefinite postponement of a balanced budget, enlarging Government competition with private industry, inevitably assuring a vast and overwhelming burden of

new taxation, steadily increasing the risks of enterprise, and, by multiplying the elements of uncertainty, discouraging those future commitments essential to the revival of private activity."

Multiplicity of Code Rules and Regulations Cited

A GRAPHIC picture of the difficulties with which industry is confronted while trying to function under code control was presented in an appraisal of NRA by Gilbert H. Montague, chairman of the committee on NRA of the New York State Bar Association. He stated that codes, executive orders, rules and regulations comprise nearly 18,000 closely printed pages and no one can tell how much if any of this executive-made law will continue in existence after June 16. Functionaries who administer the code in various capacities now aggregate upwards of 5000 or 6000 persons and the personnel of these thousands of law-making functionaries is constantly changing.

Hundreds of business men, the speaker pointed out, having complied with every provision of every code that they ever thought applied to them, are now awakening to the unpleasant realization that they are today in peril of criminal penalties, injunction proceedings, damage suits and heavy money forfeits for failure to comply under unsuspected provisions of other codes to which they had never given any attention because they never realized that these codes were in any way applicable to them.

Expressing the belief that the Supreme Court is in a receptive mood toward modification of the anti-trust laws, Mr. Montague said that voices have repeatedly come from that court during the depression, inviting the resurvey of our economic organization and a reconsideration of the social and economic consequences of an unrestrained competitive system. "Who can measure," he asked, "how fast and how far the Supreme Court might have penetrated to a more liberalized and more expansive interpretation of what is and what is not fair competition if there had been put up to the court some well grounded, well reasoned findings and executive-made laws?"

"With the best of intentions but with the deadliest of results, well meaning reformers inside and outside of the Government, without regard to statutory safeguards enacted by Congress or constitutional safeguards established by the Constitution, have been inflicting upon American business a succession of nostrums and panaceas that in the

aggregate now constitute the most extreme mass punishment that any industrial nation has ever administered to its own business men.

"With malice toward none, with charity for all, industry is today patiently picking its way back to prosperity amid the entanglements of illegal and unconstitutional interferences with business, encouraged by the confidence that by its own efforts American business will save itself, and by its example American business will save the lives and liberties of the citizens for whom the American Government was established."

Recounts How Recovery Has Been Retarded

TAKING for his subject, "How to Retard Recovery," W. B. Bell, president, American Cyanamid Co., New York, admitted there have been times when he was unable himself to conceive how anyone would wish or could invent new methods by which recovery might be retarded and he has stood aghast at the ingenuity, versatility and comprehensive completeness of the Washington programs which have thus far prevented any substantial measures of recovery.

In his opinion a depression ends with the belief on the part of those with money to invest that new demand has arisen which justifies new ventures and that prices for construction are so low as to promise profit and new investment. And what spurs such investment is the thought that prices are not likely to go much if any lower and are likely to rise.

Summarizing what he designated as the specific efforts which have thus far delayed recovery he first mentioned the banking holocaust. No other civilized nation, he declared, has a banking system with defects so fundamental and outstanding; among these is a lack of a single uniform system of inspection. By inspection he did not mean the turning of our banks over to politicians as the new banking bill now proposes. The second chief difficulty of the American banking system is the existence of so many small banks with inadequate capital. We allowed politicians, he said, to take over the cleaning up of the banks and the consequence of this has been that the cleanup was not complete. Instead, by a system of Government deposit insurance we have endeavored to restore confidence in some banks that should have remained closed.

Another thing that retarded recovery was the prevention of long-

term money from reentering the market. Without this there could be no revival of construction. In this situation a securities law was enacted, but as this had defects, it proved a highly successful method of retarding recovery.

"This act and the securities exchange act with their delegation of vague and drastic powers," the speaker declared, "still chill the marrow of many who see the probability of profit and would otherwise go ahead. Investment of long-term money for construction has been discouraged by the reduction of the gold content of the dollar and the tinkering with our currency.

"However, we did not stop there," said the speaker. "We embraced the delusion which Germany had tried years before, that purchasing power would be increased by increasing wages and adopted the NRA, which is the medieval trade guild on a large scale."

The speaker emphasized that it is only on the basis of an increase in volume and consequent lower production costs that the objectives of reemployment, reduction of hours of labor and higher real wages as distinguished from nominal money wages can be attained. The speaker presented statistics to show the increase in the number of people gainfully employed and the increase in the real wages of American workers in the past 40 years.

NRA also did infinite damage, Mr. Bell declared, in increasing the disproportion between agricultural prices and industrial prices. But we did not stop there. We invented the AAA, undertaking to remedy the paradox of want among plenty by abolishing the plenty. This, he said, was a supreme achievement.

Perhaps the greatest single and most powerful retarder of recovery in the opinion of the speaker has been the further unbalancing of the budget.

Listing new methods by which recovery can be further delayed, Mr. Bell first mentioned the turning over of control of credit facilities to politicians. This scheme, planned in Title 2 of the proposed new banking bill, may make your Congressman your most effective intermediary when you desire credit. Under this same banking bill it no longer will be necessary that the usual commercial collateral be furnished and there need be no limit to the period required for the liquidation of the collateral. Other retardants to recovery, according to the speaker, are the Wagner

labor disputes bill, taxation, and the bill to dismember utility holding companies. "Nothing is so helpful to restore recovery as a balanced budget," he declared. "We are trying to squander our way to prosperity."

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Warns of Danger of Radio as Propaganda Medium

DANGERS resulting from the increased use of the radio to spread propaganda were emphasized by Louis Ruthenburg, president, Servel, Inc., Evansville, Ind., in discussing practical treatment of industrial relations problems. Pressure for solution of these problems, he pointed out, becomes more acute after a protracted period of serious economic distress when self-seeking politicians, badly balanced theorists and all manner of social reformers obtain receptive hearing and enthusiastic support from chronic malecontents. Today the speaking voice, which sways emotions far beyond the power of the written word, goes forth from a single source to the eager ears of millions of listeners. None, he said, can predict the outcome.

The art of propaganda, as practiced by dictators, political administrations, demagogues and reformers, has been effected to a degree that sets at naught all previous standards as to probable effect. Employees are constantly influenced to believe that the operations of American industrial management are inimical to their interests. Such harmful propaganda is fostered, he said, and abetted not only by impractical reformers but by many holders of high political office and by the activity of thousands of Government employees.

Industrial management has not done a particularly effective job in selling itself to the people most likely to be affected by the sales talks broadcast by purveyors of social panaceas. If industrial disturbances are to be avoided, management must compete intelligently and aggressively for the support and loyalty of our workmen. Management should provide an effective program to establish the soundest relationship attainable between the employer and his working force. Efforts must be directed towards convincing employees that their interests and those of management are not antagonistic, but mutual. Employees should examine their existing policies which effect employee relationship, some of which may need revision.

The speaker favored direct selling to the men by the general man-

ager, provided he has the qualifications for dealing with people in groups of considerable size. However, in larger organizations the work must be delegated in large part to the supervisory force and to the works council. The speaker also stressed the importance of the effective education of the supervisory force and of the works council.

"American industry," warned the speaker, "must make rapid progress in this matter of industrial relationships. This may be accomplished steadily, constructively, and without disruption of industrial activity if management will quickly adopt constructive measures.

"If management fails to effect rapid progress, the imposition of drastic and impractical schemes which must be tried before error is manifest, schemes which will seriously disrupt industrial activity, delay economic recovery and sadly delay constructive progress, is inevitable."

Employers show too much indifference respecting employee relationship problems, declared George Seyler, works manager of the Lunkenheimer Co., Cincinnati, in the discussion of the paper. That is a job that cannot be hired done, he said. Employers should tell their foremen their views in respect to various propaganda. Dr. O. P. Geier, Cincinnati Milling Machine Co., deplored the fact that industry has not answered over the radio the "rot" that working men are listening to. He suggested that the employers hold forums for presenting their points of view to the men and for the discussion of labor problems.

Homer D. Sayer, commissioner of the association, believed that sound plans could be adopted for bringing employers and employees closer together. It is time to inculcate in members' minds that problems of employers and employees are common, he said. He suggested that a committee of members be appointed to prepare a plan of handling this matter and that each branch should appoint an educational committee to put the plan into effect in its respective district.

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This Country Lags Behind the World in Recovery

"THE rate of recovery in the United States under the New Deal is the lowest of all nations except Czechoslovakia," declared Prof. O. G. Saxon, Yale University, who presented League of Nations statistics to support his statement. This country, he said, has gained

only slightly beyond 1931. He pointed out the fallacy of restricting production, which he said lowers the standards of living. In half the world prices have gone down and in the other half they are being held up by artificial means. Prices must seek common levels unless nations adopt intense nationalism. If we keep up the prices, we will be holding the umbrella.

"In the matter of currency we have engaged in about every known fallacy," Professor Saxon declared. Real wages have suffered a loss of 13½ per cent since 1932. We must recognize that we are being governed by blocs that either want to help themselves or are acting in self-defense. The New Deal is resulting in the re-alinement of wealth from the pocket of one man to that of another. Business must be assured that the profit motive will not be impaired. The recovery we have experienced is in spite of and not because of the New Deal."

"No scheme of employment insurance can possibly prevent the recurrence of depressions nor survive long periods of distress," declared Prof. Edwin S. Todd, Miami University, Oxford, Ohio, in discussing "Social Security vs. Economic Progress." The general unemployment insurance scheme, he said, is doomed to failure because it cannot be placed on an actuarial basis. He urged economic progress brought about by farsighted and broad-minded business leaders instead of economic security legislation under political enforcement.

"Americanism and Communism" was discussed in a stirring address by Congressman Hamilton Fish, Jr., New York. "The time has come," he said, "for business men to assume the offensive instead of taking the defensive in upholding American institutions." The best way to combat Communism in the United States in his opinion is by education. He declared that the recognition of Soviet Russia should be withdrawn, as it was a gigantic hoax perpetrated upon the American people by the President and the Brain Trust. He estimated the number of Communists and their sympathizers in the United States today at 1,200,000.

A warning that Title 2 of the President's banking bill is a dangerous threat of political control of the banking system and a threat to the durable goods industry was sounded by Malcolm Muir, president, McGraw-Hill Publishing Co. This bill, he said, delivers the banking system over to political managers and gives them control of

currency and credit. The President could replace members of the Federal Reserve Board by Administration men and thus secure complete domination of the banking system. With this domination banks could be forced to purchase Government bonds to provide funds to finance new socialistic experiments.

In a talk at a dinner meeting, Malcom W. Bingay, editorial director, Detroit *Free Press*, expressed the belief that "Prosperity will return despite everything the New

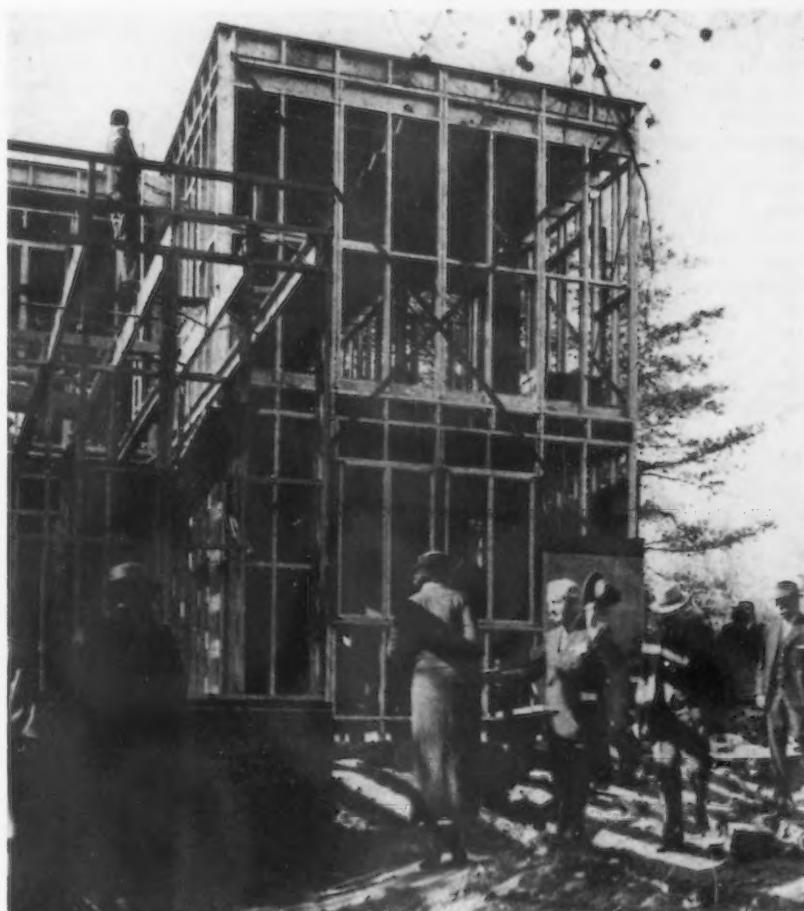
Deal can do to prevent it. The political elements of a democracy are tremendously over-emphasized and exaggerated," he said.

"To me the sound and fury, the froth at the top, during an ocean storm, symbolize the politicians. Down underneath, in our laboratories, among our business men with the vision to go ahead, are the great silent tides. Washington can hinder but cannot destroy as long as we remain a democracy."

Berloy Steel Frame House Erected At Washington

Thousands of people have inspected the home being built in Bethesda, Md., a suburb of Washington, the steel frame of which was erected last week. Architects, engineers, architecture classes, Government officials and the buying public generally witnessed this demonstration, along with officials of the Berger Mfg. Co., Canton, Ohio, designer of the house, and of the Republic Steel Corp., its parent company. The most apparent point about the Berloy steel frame houses is that they are neither steel nor prefabricated in the accepted sense of the word. The houses are not "steel" houses,

but utilize steel only where the producers say it can be most efficiently and economically used. To a major degree the steel takes the form of rectangular units of strip steel which take the place of typical wood frame construction and "C" joists for the floors and roof. Beyond this, steel is used in the stairway, cabinets in kitchen and bath room, heating ducts and other places of minor importance. The accompanying photograph shows the completed steel frame work of one end of the house. Further details on the construction of the Berloy house were carried in *THE IRON AGE*, May 9, 1935, page 40.



Broader Uses for Alloy Steels Stressed At Purchasing Agents' Convention

THE present decade has marked the beginning of a new era in which broader uses were found for alloy steels, according to William J. Priestley, vice-president, Electro Metallurgical Corp., New York, speaking this week before the twentieth international convention of the National Association of Purchasing Agents, at the Hotel Waldorf-Astoria, New York.

Pointing out that there is a marked trend toward the increased use of alloy steels in all industries, Mr. Priestley quoted a steel company executive who said that the average man does not realize how great a part stainless steel now plays in his daily life.

"Even though he does not happen to have kitchen utensils, tableware and ornaments made of stainless steel," he continued, "the average citizen will be surprised to learn how intimately these products are associated with his daily life and how much his welfare is improved by the development of these steels. He probably cleans his teeth with a toothpaste which, for sanitary purposes, has been mixed and prepared in stainless steel equipment. His razor blade is made of high chromium steel to prevent rusting. His morning paper has been produced by processes which use stainless steels extensively. His coffee cream and milk have been pasteurized in stainless steel equipment and probably transported in stainless steel tanks to avoid contamination and bacteria. The butter, cheese and other dairy products which he consumes daily are practically all processed in stainless steel equipment.

"In transportation," said Mr. Priestley, "we had the horse drawn vehicle, the steam locomotive, the street car, the bus, the individual automobile and then the airplane. Each was an improvement over its predecessor for speed of transportation and it was only through improvement that some were not made obsolete altogether. Competition from the automobile and airplane has resulted in the building of streamlined high-speed trains. These required new forms of motive power and high strength alloy steels to save weight and assure safety. The same is true in all our mechanical and processing industries until today we find very few that have not shown some

form of improvement in the last decade. It may be safely said that it will ever continue thus as long as scientists work and men compete for business.

Various Grades of Stainless

"The various grades of stainless steels now on the market are generally known. Modifications from the standard compositions have frequently been found necessary in order to meet special conditions. For example—it has recently been proved that the addition of columbium or titanium to steels of this kind reduces the air hardening characteristics and makes these steels less susceptible to intergranular corrosion and more satisfactory for welding and for use at high temperatures. Selenium and zirconium have been added to improve machining properties. Twenty-five per cent chromium 12 per cent nickel, 29 per cent chromium 9 per cent nickel, and the addition of molybdenum to the standard 18-8 analysis have been found more satisfactory than the standard grades of alloy for the pulp and paper industry. For digestors, valve, fittings, pumps, heat exchangers and other parts of machinery used in this industry the corroding effect of sulphurous acid and sulphite liquors has been practically eliminated through the use of the grades of steel mentioned above.

"The addition of 2 to 4 per cent molybdenum to the standard 18-8 stainless steel has been found beneficial in improving resistance to corrosion from such materials as acetic acid and sulphite liquors, chlorides and sulphates. Twenty-five per cent chromium steel with 0.25 per cent nitrogen has also proven satisfactory for use with acetic acid. The addition of nitrogen also improves the toughness of the straight high chromium alloys.

"Chemical processes are constantly being perfected through the use of new combinations of alloys to standard grades of steel which formerly would not withstand the temperatures, pressures and corrosion involved. The use of columbium in stainless steel welding rod and the development of a new flux has made gas welding of stainless steel possible without increasing susceptibility to intergranular corrosion.

"The corrosion resisting properties of stainless steels to various dye solutions has made it possible to replace multiple units of wooden vats with a single stainless steel tank. In the dairy industry stainless steel has made possible a new method of making dried milk with cyclone driers which results in a cheaper and more sanitary product.

"For use in aircraft construction stainless steel containing 16 per cent chromium and 1 per cent nickel has been developed to give improved physical properties by heat treatment instead of cold worked and, at the same time, obtain a material which is highly resistant to corrosion.

"One of the latest applications of stainless steel for architectural work is in the form of beading for wall sections which will not corrode. Molding is available in numerous sections suitable for store fronts, display cases, picture frames and similar applications. Pipe unions are now being made with thin seats of stainless steel which greatly increases their life at only a small nominal cost.

"Comparative tests of different kinds of metals subject to abrasion in a brick manufacturing plant showed iron containing 24 per cent chromium, 2.75 per cent carbon to have outlasted all other grades of material tested.

"Heat and corrosion resisting castings containing 25 per cent chromium can now be made with materially improved physical properties by the use of high nitrogen ferrochrome. This alloy reduces the grain size and increases impact values and ductility in castings. It also improves the hot working characteristics of wrought steels of this type.

"For mill guides and similar parts where there is excessive wear combined with high temperature service, parts made of 35 per cent nickel and 18 per cent chromium have given good service. More recent developments indicate that these parts can be improved and the cost lowered by substituting 16 per cent manganese for the 35 per cent nickel.

"Four to six per cent chromium steels, usually made with 0.50 per cent molybdenum or 1 per cent tungsten, have their creep strength and resistance to scaling improved

by additions of titanium. Chromium is now being used as an addition to 13 per cent manganese steel for increasing the inherent hardness and wear resistance for parts handling earth, small stone, gravel, sand, etc. Three per cent chromium steel with carbon content varying from 0.30 to 1.50 per cent is now being used for resistance to wear and abrasion. In service, this steel gives two to five times the life of ordinary carbon steel.

"Notable progress has been made in the use of mild alloy steels of high strength to replace carbon steels for many kinds of construction and also for reducing weight of movable structures such as railroad cars, ships, travelling cranes, etc. In this classification increased use is being made of such grades as cromansil, cor-ten, manganese vanadium and nickel molybdenum copper steels.

"Through the use of briquets many iron cupola foundries are now making cast iron containing 15 per cent chromium. This metal has marked resistance to oxidation and abrasion. For temperatures up to 1600 deg. F. where oxidizing conditions are present, castings containing 15 per cent chromium are giving excellent results. Stoker links of conventional white iron averaged six months' service before replacement. Fifteen per cent chromium iron links which have been in service for two years are now in perfect condition.

"Cast iron gears made of unalloyed iron wear out quite rapidly. By the addition of 1 per cent of chromium, the life of cast iron gears has been increased from two to four fold. It has been reported that 90 per cent of all motor car cylinder blocks now contain a small percentage of chromium in the range of one-half to three-quarters of 1 per cent. The life of these new cylinders is thereby increased three fold.

"Stoker links and grate bars have given a good deal of trouble due to warpage and growth, especially when under extreme service conditions. This trouble has been practically overcome by the addition of 1 per cent chromium to cast iron. Service reports indicate the life of chromium castings from two to three times that of ordinary cast iron. The additional cost is very slight.

"In the die casting industry cast iron containing 35 per cent chromium has been found economical as compared to ordinary cast iron for goose necks and nozzles.

"Notable progress has been made in using alloy iron castings to replace steel forgings for com-

bustion engine parts such as cranks, cams, cylinders and drums. In general these castings contain from 0.30 to 1.25 per cent chromium depending upon the wear requirements.

"Chromium and vanadium are now being added to chilled iron to improve the toughness. The addition of vanadium almost doubles the impact resistance. Brake drums for trucks and buses are giving greater life when made of cast iron containing chromium, nickel and molybdenum either alone or in combination.

"The use of chromium in the malleable foundry was formerly looked upon as undesirable but, at the present time, it is being used in considerable quantities. Manganese, chromium, vanadium, copper and other alloys are all being used commercially in progressive malleable foundries. It is now possible to purchase alloy malleable iron for special service, such as resistance to wear, abrasion and corrosion. Good results can be obtained by the use of alloys and special heat treatment."

Purchasing Departments' Growth Traced

Growth of the purchasing department from "a detached and isolated 'trading post'" to an intimate, vital and essential part of any corporate organization, has come with the industrial progress of the country, B. S. Stephenson, vice-president in charge of purchases for the American Radiator & Standard Sanitary Corp., pointed out.

"Assuredly," Mr. Stephenson added, "the profession of buying has kept pace with industrial progress. Now almost forgotten are those ancient days when they gave the purchasing agent a battered oak desk and a couple of chairs in the little room at the foot of the stairs, with a pay envelope on which they hoped to Heaven he would stay honest—but hardly saw how he could. From that lowly beginning the purchasing department has climbed and builded, planned, developed, established itself and won recognition."

Mr. Stephenson devoted most of his talk to the ramifications of buying problems of parent corporations operating branch plants and offices, or subsidiary corporations. Centralized purchasing or centralized control of purchases is practically universal among such parent corporations, he said. A study of a dozen companies of national importance has revealed, he said, no two set-ups which are exactly alike, but the differences were in the degree of central office control

and in the machinery for exercising it.

E. G. Wertheimer, purchasing agent, Federated Metals Corp., Detroit, urged that care be taken to classify and prepare non-ferrous metal scrap. The revenue producing possibilities of such waste materials, he pointed out, justify the trouble which proper preparation and classification entail.

"The disposition of industrial non-ferrous metal scrap is a job that has been turned over largely to purchasing department," he continued. "The purchasing agent has a decided advantage in the sale of non-ferrous scrap metals. He knows the specifications, chemically or otherwise, under which the material was originally bought. He should, therefore, use this same specification in connection with the sale of the merchandise as scrap."

Pointing out that non-ferrous scrap frequently is worth \$150 to \$300 a ton, Mr. Wertheimer said that the profits obtainable are sufficient to encourage purchasing executives to see that the materials are displayed to the best advantage and that every facility is given to assure reliable scrap buyers of uniform quality in the materials they buy. He suggested that guarantee as to the grade of the scrap be given by the seller and that the material be displayed in well lighted rooms, packed in units of not more than 1000 lb., and that each container be left open for the examination of its contents by prospective buyers.

Scrap Metal Preserves Resources

Describing the scrap metal industry as a great factor in preserving the natural resources of the country and as a means of livelihood to hundreds of thousands of men, Richard V. Bonomo, secretary, L. Schiavone & Bonomo Brothers, dealers in iron and steel scrap, called for greater cooperation between producers of scrap metals and dealers.

Speaking at a group meeting, Mr. Bonomo pointed out that the scrap industry has grown from an unknown quantity and quality in the industrial development of the country until, today, it represents a very important and necessary source of supply for products of many of the articles needed in contemporary industrial life and civilization.

He urged the purchasing agents to make sure, when marketing scrap metals, that they are dealing with responsible companies which are in good standing in their communities and are properly covered with workmen's compensation and public liability insurance.



Improvements in Production

Timken Installs Giant Grinder for Finishing Large Cups and Cones

THE vertical precision grinder shown in the illustration below has been added recently to the production equipment at the Canton, Ohio, plant of the Timken Roller Bearing Co. Weighing 105,000 lb., requiring three cars to ship, and standing 18 ft. 6 in. above the floor level, the machine is believed to be the largest of its kind. It was built by the Niles Tool Works Co.

The machine is designed to grind the large cups and cones used in heavy-duty Timken bearings to a new degree of accuracy considering their size, a test run on a bearing cup having an outside diameter of 47 in., showing a runout of only 0.00025 in. The machine is set up to grind units up to 65 in. O.D. and 36 in. high.

A 66-in. diameter magnetic chuck, driven by a 5-hp. variable-speed motor, is employed. Two vertical spindles approximately 12-ft. long, each driven by a 25-hp.,

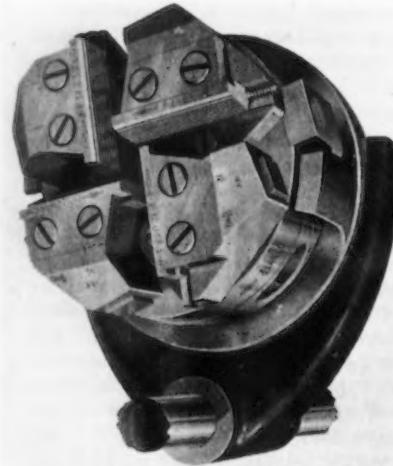
1200-r.p.m. motor, and one horizontal spindle driven by a 5-hp., 1800-r.p.m. motor, enable three surfaces to be ground at one setting, included angles up to 60 deg. being within the range of this machine. Ten motors are required in the operation of the unit. The two vertical spindles are reciprocated hydraulically. The machine is Timken bearing equipped at all points.

Revolving Die Head With Taper Attachment

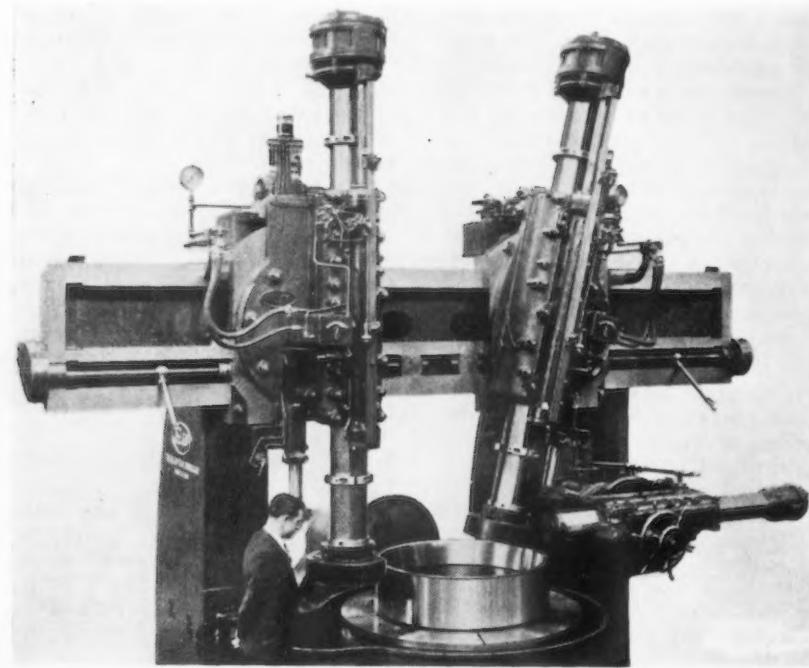
TAPERED threads are produced by use of a revolving die-head with taper attachment announced by the Landis Machine Co., Waynesboro, Pa. The head is an adaptation of the company's $\frac{3}{4}$ -in. Lanco head, but has a standard capacity up to $1\frac{1}{4}$ in., American

tapered pipe thread, with maximum thread length of $1\frac{1}{4}$ in. The equipment is illustrated below. By using special oversize chaser holders, diameters up to $2\frac{3}{4}$ in. can be cut with a maximum thread length of $1\frac{1}{8}$ in. Any degree of taper can be provided up to 2 in. taper per ft. by using the proper operating ring and cam shoe. The head is suitable for application to practically any make of automatic chucking machine employing revolving type die head.

The taper cutting action is obtained through a cam which is integral with the operating ring. Attached to the closing ring of the die head is a cam shoe which is machined to correspond to the operating cam. As the threading



Various lengths of taper threading are controlled by length of cam travel. Degree of taper is obtained by an operating-ring and cam shoe.



spindle moves forward the closing yoke on the die head contacts the usual adjustable stop nut on the stop bar on the machine just as the chasers begin to form the thread. At this point the forward travel of the operating ring is retarded while the die head itself continues to move forward to produce the thread. As the die head moves forward onto the work this

and Shop Equipment . . .



construction causes the chasers to open gradually, thus generating a tapered thread. When the cam shoe has traveled the full length of the cam on the operating ring the die head automatically opens. Adjustment for thread length is obtained by setting the stop nut on the stop bar.

Since the forming and the finishing of the thread are done by the first few teeth on the chasers, cutting strains are no greater than would be required for cutting a straight thread of corresponding diameter. The length of tapered thread which can be cut is not limited to the width of the chasers, but is controlled by the length of the cam travel.

Magnetic Disk Brake Has Wear Indicator

A MAGNETIC disk brake for either floor or motor mounting is announced by Magnetic Mfg. Co., Milwaukee. Five sizes are in production and can be supplied for either a. c. or d. c. operation.

The range covered is from 10 to 90 ft. lb. torque, for continuous duty operation. Specifications include manual release, lining wear indicator, constant torque provided at all times and not subject to variation from lining wear, and provision for easy replacement of linings when necessary. Through-shaft applications can be made, and when desired, marine finish, water-resisting and water-proofing are supplied.



Cylindrical Air-Draw Furnace Has Wide Range Temperatures—250 to 1250 Deg. F.

A NEW line of cylindrical air-draw furnaces is announced by the Industrial Gas Engineering Co., Chicago. As shown by the illustration, below, the new furnace is portably mounted on a steel base, and is provided with a split cover having a center opening which facilitates handling of the treated material by hoist and permits of treating long, thin parts in suspension to eliminate warping and bending.

The method of heating the furnace is similar to the universal recirculating method introduced by the company. The principle lies in circulating a large volume of heated air rapidly throughout the furnace, attaining a rapid

heating up and heat transfer to the furnace load as well as uniform furnace temperature.

The system is simple in construction and operation and flexible between any temperatures from 250 deg. F. to 1250 deg. F. Temperatures can be automatically maintained. Suitability is for all processes requiring temperatures within this range, such as carbon, high speed and alloy steel drawing, brass, copper, aluminum and various aluminum alloy annealing and tempering.

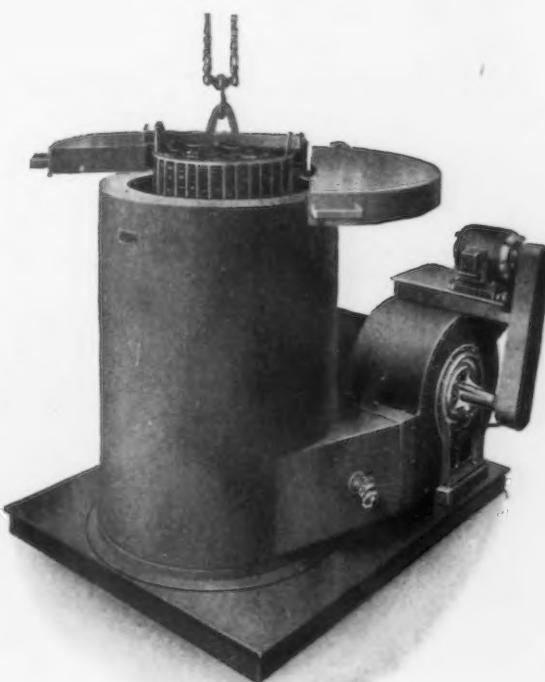
Three standard sizes of equipment are available: type CF-1, 24 in. in diameter and 36 in. deep; type CF-2, 30 in. in diameter and 48 in. deep, and type CF-3, 36 in. in diameter and 60 in. deep.

AT RIGHT
Furnace suitability is for drawing, annealing and tempering of various materials.

A split cover facilitates the treating of materials in suspension. See above.

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AT LEFT
Magnetic disk brake has wear indicator.
See column 1.



Gears Burnished and Shaved in One Operation

FOR the production of precision gears by simplified methods the National Tool Co., Cleveland, is offering the Burni-Shave gear finisher, which by combining the burnishing with the shaving operation eliminates automatically one step in production. The illustration is below. It is stated that tests have proved that the National-Cleveland (Simmons method) Burni-Shave will produce gears approximating the extreme accuracy required in ground master gears. In some cases gears with tooth spacing error of more than 0.002 in. and error in tooth form of more than 0.002 in. have been corrected to a tolerance of less than 0.0002 in.

The new gear-finishing tool can be used on any gear tooth-burnishing machine or, with a fixture,

adapted to a milling machine. It is applicable to all gears, spur and helical, internal as well as external. In actual production, gears of average size are said to have been finished by the Burni-Shave method in less than 15 sec. The illustration herewith shows a set of helical Burni-Shave gears.

Force feed pressure lubrication is used, oil being delivered to the bearings by a plunger pump. Pistons and cylinder walls are lubricated by the oil spray of the crank pin. The compressor may be run in either direction.

The main bearings are of the Timken heavy-duty, tapered roller type. This use of roller bearings decreases the distance of the center of the main bearings to the center of the crank pin, making possible the use of compact and rigid crankshaft assembly.

The crankshaft is of chrome-nickel-molybdenum alloy, ground to size and accurately counterweighted. Connecting rods are of drop-forged steel, heat treated, having steel backed, babbitt lined, ribbon-type crank pin bearings. Pistons are of the light-weight automotive type, ground to fit the cylinder bore, and three compression and one oil ring are used on each piston. Valves are of the "cushioned" noiseless automotive plate type, the cushioning being accomplished by the use of an air cushion pocket in the guard or bumper over each valve.

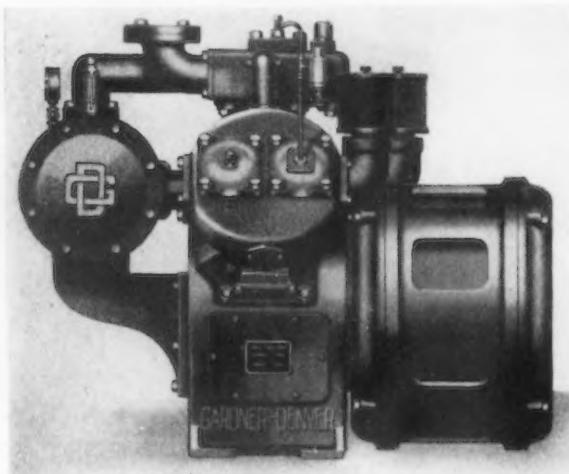
New 3-Cylinder Air Compressor

AVAILABLE in sizes ranging from 113 to 194 cu. ft. per min. displacements, a new line of three-cylinder air compressors, designated "WBR," is announced by the Gardner-Denver Co., Quincy, Ill.

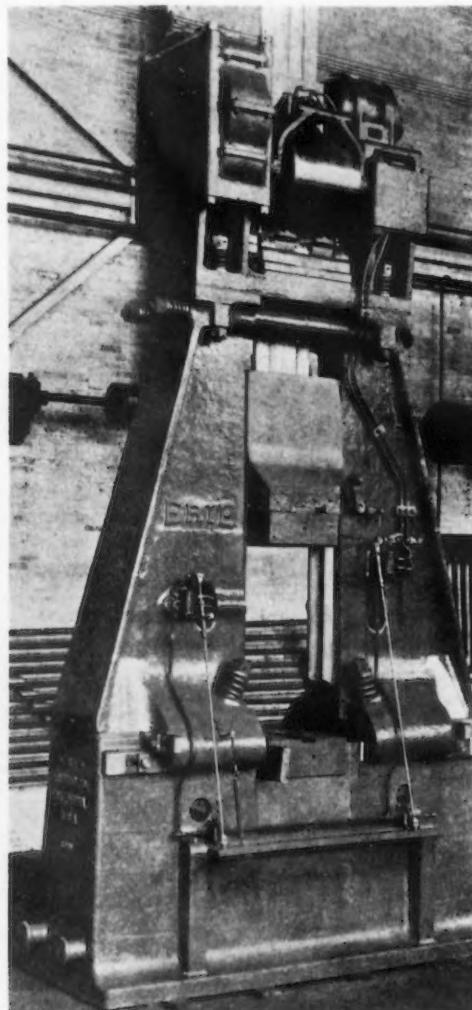
These new compressors employ two small low-pressure cylinders instead of one large cylinder. This design is said to result in low air temperature. Cylinder walls are water-cooled to provide low wall temperature.



Burnishing and shaving of gears in a combined operation is described above.



New 3-cylinder air-compressor.
See column 2, above



Improved Drop Hammer Has Air Control

CHANGE in type of control is a feature of the improved board drop hammer, page 24, which is being marketed by the Erie Foundry Co., Erie, Pa. Both the friction bar at the front and the clamp operating bar at the back of the hammer have been eliminated, their function being performed by two small cylinders operated by compressed air. As the treadle merely works the control valves which admit air to the cylinders, only a few pounds pressure is required to work the treadle.

The new hammer must be treadled just as steam drop hammers are, with the treadle being moved for each individual blow; consequently the length of each stroke is controlled and can be varied to suit the work. The new hammer is also equipped with a device by means of which it can be made to run automatically at full stroke, the same as a standard type of board drop.

Welding Fixture Has Inclinable Turntable

INCLINABLE turntable mechanism features easier handling of circular pieces in a new welding fixture brought out by the Harnischfeger Corp., Milwaukee, below.

To enable the operator to weld continuously in a downward position, the turntable is equipped with an electrical rotating mechanism with gear shift and variable speed motor control. Speed can be accurately regulated from 3 to 18 in. per min. in either direction at the circumference of the 42-in. table. Thus, for example, in welding a



circular piece the operator may hold the rod in a steady position as the work passes beneath it at the desired speed. The turntable can be tilted from one side of the base to the other or held in a horizontal position. Recently, fabricating time on a huge gear was reduced from 32 to 13 hr., when 65 $\frac{3}{8}$ -in. rods were deposited in 2 hr.

Designated as the "RT," this new fixture is offered in various sizes to handle loads up to 4 tons.

Stress Strain Recorder Brakes Falling Weight

A NEW weight-motor type of stress strain recorder for application to Southwark-Heydekamp testing machines has been announced by the Baldwin-Southwark Corp., Philadelphia. The equipment is illustrated below. By means of adapters, the equipment is also available for other types of testing machines.

In this design, the load movement of the recording device is directly controlled from the load indicating mechanism. The strain motion is controlled through a Goodyear Zeppelin (or Templin type) extensometer, a sensitive relay and solenoid actuated brake which controls the fall of weight.

It is said that the records from

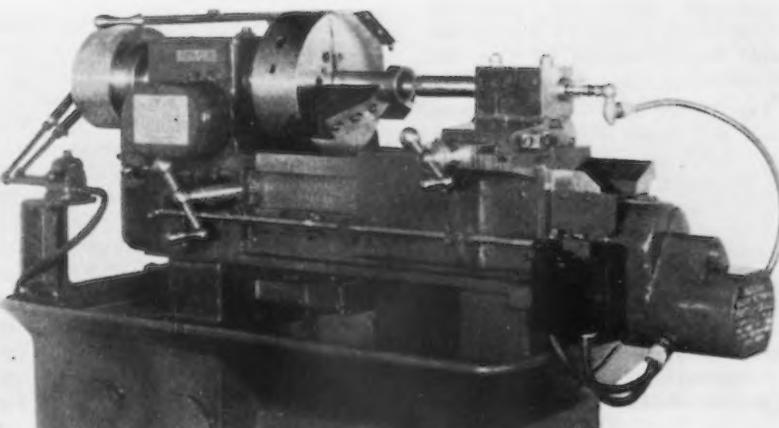
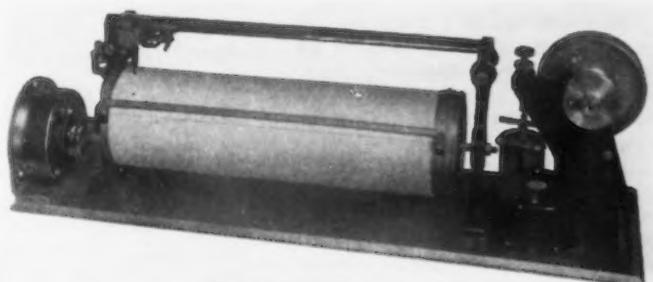
this stress strain recorder can be made nearly equal to those from the Southwark-Emery type in smoothness and accuracy.

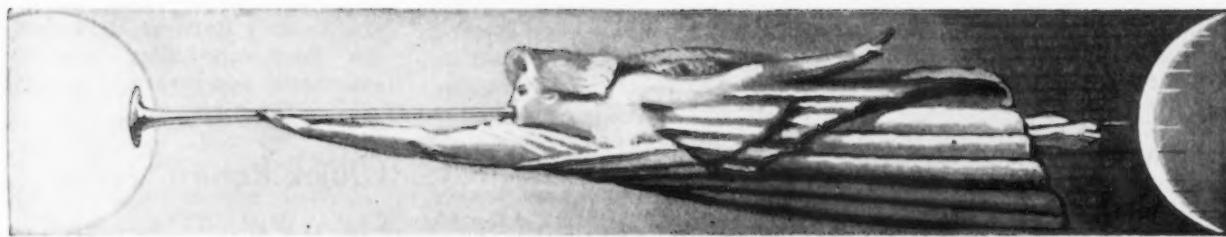
Quick Return Device Electrically Operated

A DEVICE for quick electric operation of carriage on Carbolathes, built by Porter-Cable Machine Co., Syracuse, N. Y., is illustrated below. It consists of a separate electric motor attachment which is fastened to the end of the lathe bed by four cap screws and two dowels. Connection to the feed shaft, running through the center of lathe bed, is with a flexible coupling.

Motive power is supplied by a special 1/3-hp. motor having special torque winding and capable of 300 per cent overload. This motor is regularly furnished in 220 volt, 60 cycle, 3 phase; 440 or 550 volt can be furnished, also two phase, but not single phase.

Motor and jack shaft are ball bearing, the motor being totally inclosed. A spring loaded disk clutch is built into the gear drive which is adjustable so that it will just drive the carriages, and assures that if power feed of table is engaged and the motor is started, clutch will slip, protecting motor.





NEWS OF THE WEEK

Beaver-Mahoning Canal Project Allotted \$5,000,000 from Works Relief Fund

THE proposed Beaver-Mahoning navigable waterway to connect the Youngstown district with the Ohio River at Rochester, Pa., moved one step nearer reality last week when the Advisory Committee on Allotments recommended that \$5,000,000 of the Government's \$4,800,000,000 work relief program be extended for starting the canalization work. The advisory committee's recommendation has been interpreted by those sponsoring the canal as practically assuring the President's approval of the Rivers and Harbors Bill, which has been passed by the House and which includes the proposed canal.

The committee, in recommending the expenditure, pointed out in its report that Army engineers have approved the work because it would provide needed facilities for navigation in a highly congested Valley manufacturing district. Antagonists of the proposed canal contend that the Youngstown district is adequately served by railroads and that the waterway would gravely endanger the interests of steel and coal producers in the Pittsburgh area by providing Youngstown producers with cheap water transportation for fuel and an outlet for steel products.

The Upper Ohio Valley Association and other Pittsburgh interests, who are strongly opposing the Beaver-Mahoning project, have urged Senators, Public Works Administrator Ickes and Relief Director Hopkins to provide a hearing of the opposition before the Senate Commerce Committee. It is reported that Senator Copeland, chairman of the committee, favors a hearing. The United Mine Workers of America have united with the Upper Ohio Valley Asso-

ciation in opposing the canal.

The initial Government grant of \$5,000,000, it is held, would be only a small part of the total cost of the canalization of the Beaver and Mahoning Rivers as far as Struthers, Ohio. The dredging and widening of the rivers, including locks and dams, would cost approximately \$47,000,000, according to proponents of the canal. Estimates procured by the Upper Ohio Valley Association run as high as \$72,000,000, which would exceed any previous sum expended for a canal in the United States.

Pittsburgh interests who are

opposing the canal contend that the waterway would penalize the Pittsburgh district unless the project were extended north from Struthers, Ohio, to Lake Erie. The extension, however, has not yet received approval of Army engineers.

Of the total estimated cost of the canal of \$47,000,000, as claimed by its sponsors, \$37,000,000 would be paid by the Government and the remainder by Youngstown interests. An estimated annual saving of more than \$6,000,000 in transportation costs, it is claimed, would result from the canal, chiefly on fuel from the Pittsburgh district. It also would provide an outlet for pipe, wire and flat-rolled steel. Incoming tonnage is estimated at nearly 8,000,000 tons, and outgoing tonnage at 1,225,000 tons.

Algoma Steel Corp. Effects Reorganization

THE Algoma Steel Corpn., Ltd., Sault Ste. Marie, Ont., which has been operated in receivership since June 20, 1932, has been reorganized, and the new company, with the same corporate name, took over all of the properties and their management on May 4.

The reorganization was made possible by an agreement of the bondholders of the company. Enabling legislation was passed by the Ontario Parliament and the bill proclaimed by Order in Council on May 3. There are, at present, no outstanding bonds, provision being made for approximately 27,000 shares of 5 per cent preference stock of par value of \$100 per share, non-cumulative for five years, thereafter cumulative, with a right of conversion during the first 10 years on the basis of one share common no par stock for each share of preference stock,

such stock to have full voting rights. Provision is made for 130,000 shares of no par common stock.

The new company assumes all liabilities of the receivers and managers and the preference and common stock is being issued to the bondholders under the terms of the agreement.

Prior to the taking over of the property by the new company, it was being operated by W. C. Franz and John A. McPhail, Sault Ste. Marie, and Sir William E. Stavert, of Montreal, as receivers and managers.

The following officers have been elected, and are now in charge of the affairs of the company: Sir James Dunn, Bart., London, Eng., chairman and president; W. C. Franz, first vice-president; John A. McPhail, second vice-president; T. F. Rahilly, director and general manager; William Jeffrey, secretary; E. W. Shell, treasurer, and E. Carey, comptroller. All of the officers except Sir James Dunn are at Sault Ste. Marie.

British Pig Iron Output Now Sold Through Quarter—Export Trade Active

ONDON, May 20 (By Cable).— Pig iron specifications are larger, and increasing inquiries for forward parcels are reported. Output is sold up to the end of June. Hematite makers are heavily booked, and further expansion is expected.

The import quota allotted by the Continental Cartel has already been exhausted and consequent heavy demand for English billets and sheet bars may necessitate an increase in output. The fixed official prices for finished steel are unchanged. Increased output has enabled a sensible reduction in production costs.

Plate demand is unsatisfactory. Sheets are more active but output is still far below capacity. Home demand for structural and railroad material is heavy. The export trade is healthier than in several years.

Tin plate is quiet. Unfilled orders are below 2,500,000 base boxes and output is at about 50 per cent of capacity. It is hoped that better inquiry caused by the recent increase in official home trade minimum prices may result in actual business. The Continental iron and steel markets are dull. Business with the United Kingdom is light and Far Eastern demand is affected by the silver rise.

An early conclusion of the export agreement with the United Kingdom is considered unlikely, so that prolongation of the present three months' temporary agreement limiting Continental exports to the United Kingdom is probable.

April exports of pig iron from Great Britain were 18,600 tons of which 3560 tons were shipped to the United States. Total exports of iron and steel were 200,800 tons.

J. & L. Purchases National Bridge Works

JONES & LAUGHLIN STEEL SERVICE, INC., warehouse subsidiary of the Jones & Laughlin Steel Corp., Pittsburgh, has purchased the fabricating shop, warehouse and business of the National Bridge Works, Long Island City, N. Y. The new properties, which will be known as the National Bridge Works division of Jones & Laughlin Steel Service, Inc., will be operated under direction of Harry B. Royer, formerly president and manager of the National works.

Jordan Again Heads Conference Board

D. VIRGIL JORDAN was continued as president and Howard Heinz was reelected chairman at the annual meeting of the National Industrial Conference Board held at the Waldorf-Astoria, New York, May 16. Irénée du Pont, director, E. I. du Pont de Nemours & Co., Wilmington, Del.; Walter J. Kohler, president, Kohler Co., Kohler, Wis., and John Henry Hammond, of Hines, Rearick, Dorr

& Hammond, New York, were elected vice-chairmen. Fred I. Kent, director, Bankers Trust Co., New York, was reelected treasurer.

Dr. Jordan expressed pessimism because of what he characterized as continued intellectual confusion and emotional thinking, but also felt confident that "in the long run the American temperament will assert itself against the swift intrusion of the alien philosophy" of collectivism upon which, he said, the yearning for "a security system" as opposed to the "enterprise system" rests.

Mining Congress Urges Coal Stabilization

FAVORING industry stabilization and price fixing but willing to argue the merits of the NRA members of the American Mining Congress held their largest convention in Cincinnati last week. About 4000 delegates and guests attended.

Stabilization of the coal industry is needed for the protection of invested capital, the protection of wage standards, the conservation of coal resources from waste, and the steadyng of employment in the mines, according to the report of the National Resources Board given by Dr. John W. Finch, director of the Bureau of Mines, Washington. Extracts from the report were presented to the Congress by Dr. C. K. Leith, vice-chairman of President Roosevelt's planning committee for mineral policy of the National Resources Board, following which there was a general discussion of the report by some 20 leaders of the coal industry from all parts of the country.

"The task before the nation is to help these industries (coal and oil) to prevent competitive waste; bring supply into balance with requirements; stabilize employment; limit cut-throat competition, and by achieving some measure of stability permit the savings of the underlying resources which technology has already shown to be possible," the report stated.

"While it is clearly inadvisable to authorize price fixing and limitation of output in the great majority of our industries, such as general manufacturing and trade, it may prove to be wise, indeed necessary, in those industries involving natural waste, such as coal and petroleum."

To accomplish this, the report recommended that the NRA code authorities of the various coal districts set up technical committees on conservation in each mining dis-

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese,	
export	29
Billets, open-	
hearth	£5 10s. to £5 15s.
Tin plate, per	
base box.....	*18s. 2d. to 19s.
Steel bars, open-	
hearth	£7 17½s.
Beams, open-	
hearth	£7 7½s.
Channels, open-	
hearth	£7 12½s.
Angles, open-	
hearth	£7 7½s.
Black sheets, No.	
24 gage.....	£9 5s.
Galvanized sheets,	
No. 24 gage..	£11 5s.

*To June 1; 18s. 5d. to 19s. 3d. thereafter.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.		
Billets, Thomas.	£2	7s.
Wire rods, No. 5		
B.W.G.	£4	10s.
Steel bars, merchant	£3	5s.
Sheet bars.....	£2	8s.
Plate, 1/4 in. and up	£4	
Plate, 3/16 in. and 5 mm.	£4	2s. 6d.
Sheets, 1/8 in....	£4	7s. 6d.
Beams, Thomas.	£3	2s. 6d.
Angles (Basic)..	£3	2s. 6d.
Hoops and strip base	£4	2s. 6d.
Wire, plain, No. 8	£5	7s. 6d.
Wire nails.....	£5	15s.
Wire, barbed, 4 pt. No. 10		
B.W.G.	£8	15s.

trict which "shall be charged with the duty of formulating reasonable standards of extraction, such standards to be recommended to land owners for incorporation in coal leases to mine operators.

Serious consequences to the steel industry of America were predicted by Dr. Finch if the sales volume of metallurgical coals continues in the same volume as that prior to 1929. Dr. Finch said that, according to the report of Howard N. Eavens-

son, Pittsburgh mining engineer and former president of the American Institute of Metallurgy, more than 11 per cent of the deposits of the highest grade gas and metallurgical coals of the Kentucky field and more than 22 per cent of the high-grade coals of West Virginia and southwest Virginia fields had been exhausted.

He predicted that the life of the bituminous coal beds of Pennsylvania is limited to 100 years, and

that of the famous high-grade smokeless coals of southern West Virginia to 85 years, if production continues with the same "reckless waste" as up to 1929.

Commissioners of the District of Columbia have readvertised for bids, to be taken May 27, for about 100 tons of license tag sheets. A previous award of the tonnage was withdrawn because of an error made in calculating estimates.

Production of Steel Products for Sale in First Quarter by Code Members

(AMERICAN IRON AND STEEL INSTITUTE)

	Number of Com- pa- nies	Items	Annual Capacity, Gross Tons	Total	Per Cent of Capacity	Production for Sale (Gross Tons)	
						Shipments	To Members of the Iron and Steel Code for Conversion Into Code Products
STEEL PRODUCTS:							
Ingots, blooms, billets, slabs, sheet bars, etc.	39	1	...	1,143,025	...	19,715	1,030,393
Heavy structural shapes	14	2	5,440,820	257,343	18.9	9,128	...
Steel piling	5	3	270,000	24,859	36.8	1,904	...
Plates—Sheared and Universal	27	4	6,220,753	304,695	19.6	10,981	1,642
Skelp	11	5	...	76,124	...	1,789	56,900
Rails—Standard (over 60 lb.)	7	6	4,850,000	151,085	12.5	1,775	...
Light (60 lb. and under)	8	7	775,820	12,436	6.4	422	...
All other (incl. girder, guards, etc.)	2	8	140,000	5,037	14.4	301	...
Splice bar and tie plates	19	9	1,622,393	56,180	13.9	714	...
Bars—Merchant	46	10	...	653,470	...	13,161	69,295
Concrete reinforcing	37	11	...	96,628	...	2,134	...
Cold finished—Carbon	19	12	...	125,560	...	1,303	...
Alloy—Hot rolled	18	13	...	138,337	...	849	11,930
Cold finished	14	14	...	14,323	...	52	...
Hoops and baling bands	6	15	...	10,614	...	115	...
Total bars	73	16	13,087,907	1,038,932	31.8	17,614	81,225
Tube rounds	6	17	...	15,714	...	...	10,999
Tool steel bars (rolled and forged)	17	18	106,321	7,646	28.8	423	...
Pipe and tube—Butt-weld	15	19	1,906,786	114,529	24.0	8,326	...
Lap-weld	10	20	1,726,734	57,849	13.4	3,625	...
Electric-weld	4	21	819,571	14,186	6.9	100	...
Seamless	15	22	2,520,978	175,933	27.9	8,973	...
Conduit	6	23	142,350	9,614	27.0	...	...
Mechanical tubing	5	24	212,050	20,237	38.2	1,543	...
Wire rods	19	25	...	125,736	...	4,996	60,665
Wire—Drawn	48	26	1,804,976	226,785	50.3	8,476	2,518
Nails and staples	26	27	1,181,587	92,799	31.4	3,455	...
Barb, fence, bale ties, fence posts, etc.	27	28	1,590,739	111,250	28.0	7,940	...
Black plate	15	29	408,879	67,829	66.4	1,893	23,111
Tin plate	17	30	2,648,256	391,354	59.1	46,196	...
Sheets—Hot rolled	25	31	...	314,223	...	5,047	22,184
Hot rolled annealed	25	32	...	383,481	...	10,937	1,079
Galvanized	19	33	...	178,577	...	19,567	...
Cold rolled	20	34	...	443,921	...	8,294	...
All other	17	35	...	99,672	...	1,788	...
Total sheets	37	36	7,706,967	1,419,874	73.7	45,633	23,263
Strip—Hot rolled	35	37	3,424,052	545,363	63.7	9,287	61,855
Cold rolled	41	38	1,011,754	146,542	57.9	1,902	...
Wheels (car, rolled steel)	6	39	398,284	26,756	26.9	6,784	...
Axles	9	40	441,900	6,072	5.5	1,458	...
Track spikes	12	41	345,760	13,394	15.5	202	...
All other	6	42	21,207	2,817	53.1	1,094	...
Total code steel products	181	43	...	6,661,935	...	226,649	1,352,571
Estimated total steel finishing capacity based on a yield from ingots of 69.4 per cent	...	44	47,040,900	...	45.1	...	...
IRON PRODUCTS:							
Pig iron, ferromanganese and spiegel	32	45	...	978,759	...	694	272,588
Ingot molds	5	46	...	66,410	...	931	...
Plates	2	47	32,260	296	3.7	...	...
Skelp	1	48	...	918	...	271	647
Bars	14	49	241,919	11,520	19.0	3	460
Splice bars and tie plates	1	50	50,000	1,556	12.4	...	...
Pipe and tubes	5	51	231,153	9,062	15.7	60	...
Sheets	2	52	18,000	2,936	65.2	...	...
All other	5	53	53,300	2,652	19.9	...	...
Total iron products (Item 47 to 53)	22	54	568,672	28,940	20.4	334	1,107

Total companies included 209.

Total steel products produced for sale, less shipments to members of Iron and Steel Code for conversion into code products: Current quarter 5,309,424 gross tons: 45.1 per cent of finishing capacity.

PERSONALS

A. A. Ross, whose election to the presidency of the American Gear Manufacturers' Association is reported elsewhere in this issue, is recognized as an authority on the design, manufacture and operation of high-speed, heavy-duty gears for land and marine applications. He entered the employ of the General Electric Co. in 1894 as a machinist apprentice, after graduation from Pictou Academy in Nova Scotia. Three years later he joined the railway engineering force, in the meantime having completed a mechanical engineering course in a night school. In his railway engineering work Mr. Ross was associated with the late W. B. Potter in the development of the long-life transportation gearing of the present day. When the United States entered the war and rushed into service a fleet of ships propelled by steam turbine-driven reduction gears, Mr. Ross was assigned to the Port of New York to investigate and overcome the cause for rapid wear and failures of gears on ships being operated by the Emergency Fleet Corp. Upon completing this assignment he was placed in charge of design of high-speed and heavy-duty turbine reduction gears, and later, in 1923, when the General Electric Co. consolidated the manufacture of all types of gearing at its Lynn plant, Mr. Ross was placed in charge of the centralized engineering and manufacturing gear departments. He has been actively identified with the standardization work of the gear association, serving for several years as chairman of the general committee.

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W. F. DETWILER, executive vice-president and general manager, Allegheny Steel Co., Brackenridge, Pa., sailed for Europe last week on a business trip.

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HARRY FENNER, purchasing agent and traffic manager of the Cincinnati Shaper Co., was elected vice-president of the National Association of Purchasing Agents at the District Six meeting in Columbus recently. Mr. Fenner was the unanimous choice of the representatives from the nine associations in the district and became a national official without contest.

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J. L. MAUTHE, who has been assistant general superintendent of the Lorain, Ohio, plant of the National Tube Co., has been appointed assistant general superintendent of



WALTER H. WIEWEL, who as announced in these columns last week becomes manager of sales, tubular products, for the Jones & Laughlin Steel Corp., on June 1.

the Campbell works of the Youngstown Sheet & Tube Co. He was graduated from Penn State College in 1916, and since serving in the World War has been connected with the operating and metallurgical departments of steel plants.

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F. H. WEBSTER has been appointed director of purchases of the White Motor Co., Cleveland. He became connected with that company last December after serving for 18 years as director of purchases for the Columbia Axle Co., Cleveland.

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FRANK C. MOYER has been appointed general manager of sales of the American Shear Knife Co., Pittsburgh. Mr. Moyer will make his headquarters at 3455 West Chicago Boulevard, Detroit. He was formerly vice-president and general manager of sales for the Detroit office of the Heppenstall company.

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HANSON THOMAS has been elected vice-president of Oliver Iron & Steel Corp., Pittsburgh. He has been general manager of sales for the past three years, and will continue to hold that position.

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L. W. LYONS has been elected treasurer of the Westinghouse Electric & Mfg. Co., to succeed HERMAN F. BAETZ, who is retiring.

Mr. Lyons joined the Westinghouse organization in 1904, and for many years served as manager of the credit department. He also has held the positions of assistant secretary and assistant treasurer.

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ROBERT P. J. McCARTY has been appointed sales engineer in the New England territory by S K F Steels, Inc., New York. He was previously connected with the Ludlum Steel Co. for a number of years.

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LEON L. CLORE, who has had many years of experience in the equipment business, has been added to the sales engineering department of the Austin-Hastings Co., Cambridge, Mass. He will cover Rhode Island and Worcester County, Mass., and will make his headquarters at the company's Worcester office.

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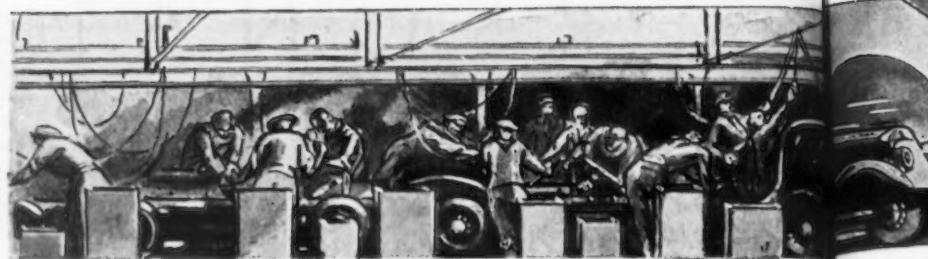
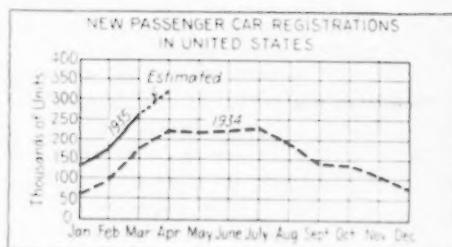
JAMES T. DUFFY, JR., has been elected president of the newly reorganized Read Machinery Co., Inc., York, Pa. Mr. Duffy was formerly general superintendent of Thompson Products, Detroit, general manager of Nice Ball Bearing Co., Philadelphia, and later a management engineer. T. F. FREED is vice-president in charge of sales and treasurer of the new company; J. I. SPANGLER, vice-president in charge of operations. J. A. EADES, who is general field engineer, is also secretary. Directors include HARRY READ, founder and former president; GEORGE L. MEDILL, DANIEL H. BLIZZARD, JOHN N. MACKALL, FRANK G. SMITH and JAMES T. DUFFY, JR.

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H. B. KNOWLTON, metallurgical engineer, International Harvester Co., was elected chairman of the Chicago chapter, American Society for Metals, at the May 9 meeting. J. F. CALIF, Automatic Electric Co., was elected vice-chairman, and K. H. HOBBIE, Driver-Harris Co., was reelected secretary-treasurer. The incoming chairman made special comment on the services rendered by the retiring chairman, H. A. ANDERSON, metallurgical engineer, Western Electric Co., under whose leadership the chapter has increased its membership to 657, the highest total of any chapter in the society.

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ROY C. KENDALL has been appointed general sales manager of the Medart Co., St. Louis, effective May 13. He formerly represented the Medart Co. in Wisconsin. Previously he was connected with the Link-Belt Co. for more than 15 years.



THIS WEEK ON THE

Steel and Parts Releases Decline As Car Makers Cut Inventories

DETROIT, May 21.

HAVING gone along at top speed for several months, the automotive production train is beginning to put on the brakes. There will not be an abrupt decline in the rate, which might give suppliers a terrific jolt, but rather a gradual easing in the breakneck pace which has kept everyone concerned with motor car manufacture sitting on the edge of his seat since last January.

For a while the industry was in one of those rare periods when unfilled orders continued to increase no matter how high the production volume got. That period is about over. Banks of orders at the factories are rapidly being reduced and by June 1 should be at or near the vanishing point. From then on through the remainder of the 1935 model season, assemblies will be governed strictly by current retail sales.

Here and there about the country weak sales spots are showing up. Not many of them, to be sure, but enough to convince car manufacturers that much of the cream is off the 1935 retail market. One spot is in the Southwest, where cash payments to farmers have been completed by the AAA. The South generally isn't so quick to buy automobiles as it was, possibly partly because the cotton situation leaves much to be desired.

There are some favorable factors, too. The dust-storm area has had snow and rain, with prospects better for crops. Crops in many parts of the country are expected to be the best in several years. This

means more money for farmers to spend, and car sales this summer should be good throughout most of the country's agricultural areas.

Good Sales Expected This Summer

If the Federal work relief program gets under way on a sizable scale soon, it is bound to help the motor car business, both directly and indirectly. How much retail sales will be hurt during the summer by public knowledge of 1936 car announcements in October and November is a moot question. The consensus of opinion in automotive circles is that new-car demand should hold up reasonably well until close to Sept. 1, when there will be a tendency on the part of prospective buyers to wait for new models. For some manufacturers April unquestionably was the peak month of the year for retail sales. Other companies, however, anticipate that the May volume will be larger than April's.

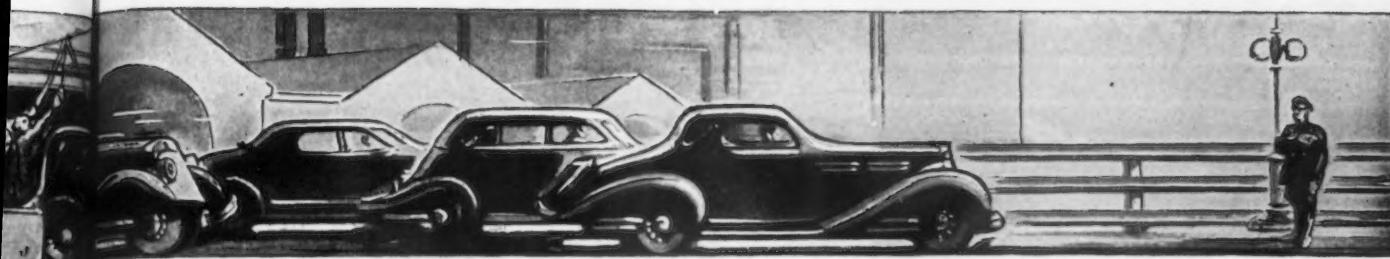
Looking ahead to a declining market, which is seasonally to be anticipated as summer comes on, car manufacturers are turning a critical eye toward inventories. Practically all companies are cutting down stocks of materials and parts. Ford, for example, has pared steel tonnage on hand to about a week's supply. Stocks of certain items actually have dwindled to three days' requirements. Some parts makers furnishing Ford have been asked to hold up shipments temporarily and are operating at a fraction of their recent production rates.

The resurgence of Chevrolet ac-

tivities, following settlement of the Toledo strike, will aid the industry's total for May, but the peak attained in April won't be touched again this year. Chevrolet's output will depend on the speed with which it can get transmissions. It has a considerable backlog of unfilled orders which will take several weeks' production at full capacity. It is expected to buy some steel for Flint this week. Fisher Body has given releases for its Cleveland plant which were held up during the recent strike. It would be a mistake, however, for the steel trade to get the impression that resumption of Chevrolet operations will result in heavy orders for steel. One should remember that the gear and axle and forge plants in Detroit and the Flint sheet metal department did not shut down while the strike was on, going ahead with the manufacture of parts.

Chevrolet probably will assemble 55,000 to 60,000 cars this month. In the first half of May Pontiac built over 10,000 cars and should turn out around 20,000 for the month. Oldsmobile will not be far off from Pontiac's total. Buick is making 400 cars a day and has 8000 cars scheduled for May. It enters the second half of May with orders on hand for 5770 cars, the largest since the first of the year. During the first 10 days of May, Buick dealers sold 2100 cars.

Ford, having returned to a five-day week after working on Saturdays for several months, has not let its daily assemblies slip under 6000 units. In May it will produce 150,000 to 160,000 cars. It still has



ASSEMBLY LINE

about 120,000 jobs tentatively projected for June. Like Chevrolet, its stocks of steel and other parts are considerably out of balance and its steel purchases will be guided largely by fill-in requirements.

Chrysler Operations High

Chrysler is believed to have benefited from the inability of Chevrolet to deliver cars during the strike. Its Plymouth factory is making around 2000 cars a day. Dodge is building 1000 passenger cars and 300 trucks daily. Chrysler and De Soto divisions are far ahead of last year, thanks to the Airstream (more conventional) series. Registrations during the first quarter, plus 14 States for April, show that 10,000 more Chryslers and De Sotos were sold this year than in the same period a year ago. It is understood that the ratio of Airstreams to Airflows is about 3 to 1.

A walkout in the body trim division of Packard's 120 plant on Thursday by members of the Mechanics Educational Society forced the company to shut down early that day. The factory opened again Friday morning, although it was short about 100 men. The trouble centers around the alleged discharge of Gary J. Connor, MESA member in the trim division. The strike comes at a time when Packard is in the midst of the best production schedule in its history, with 6200 cars expected to come off its assembly lines this month.

A strike was avoided at Hupmobile last Wednesday when the plant shut down for one day "because of lack of materials." The Automobile Labor Board had announced a plant election to choose an employees' bargaining committee and the American Federation of Labor had threatened a strike if the election took place. The Hupp management seemingly got deftly out of a tight situation by closing the factory on the election day. Afterward, the ALB declared that the

BY BURNHAM FINNEY

Detroit Editor, The Iron Age

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election would not be conducted "for some time."

A. F. of L. Makes Gains

No one should be misled by the Chevrolet AFL peace agreement at Toledo. Mature study of its terms reveals that the Federation didn't win much more than Chevrolet offered in the beginning. On the other hand, it completely scuttled the Automobile Labor Board and emerged from the strike as the chief spokesmen of workers at the Toledo plant. One is safe in predicting that the ALB will never hold the election at Toledo, which originally was planned for Wednesday of the week the strike was called. The point is that the Federation got a new lease on life through the Chevrolet strike and clearly demonstrated that it is a power to be reckoned with. It regained a substantial part of the prestige lost in the ALB's plant elections, when it was snowed under. However, even automotive executives now admit that they spoke of the overwhelming non-union victory in those elections with their tongues in their cheeks.

The Federation is expected to intensify its campaign in the automobile industry. The executive committee in Washington recently approved a charter for an International Union of Automobile Workers which will replace the present set-up of the United Automobile Workers' national and district councils and their component Federal local unions. President Green stated then that "as soon as the situation clears up" at Toledo he will begin organization of the international. This is one reason why the industry isn't happy about the labor outlook for the 1936 production season.

One unnoticed strike has been that of the dingmen at the Chrysler plants and the Mack Avenue plant of Briggs Mfg. Co. Dingmen have the job of hammering out by hand any dents, dings or other imperfections in automobile bodies. Officers of the Dingmen's Welfare Association (not an AFL affiliate) claim that the strike is the result of the refusal of the managements of the two companies to give the dingmen "job control" so that they can prevent new men from being broken in while experienced men are out of work. The strike still is in progress, although it seemingly has had no effect on production of any Chrysler division.

Car Makers Buying Equipment

Equipment makers seem likely to "go to town" shortly. Buick is reported to have bought some machine tools the past week for increased production of transmission cases. Oldsmobile is preparing to purchase machinery to expand its facilities for the manufacture of front and rear axles. Later on it will buy equipment for additional output of motors. Representatives of the Maford organization (combination of Ford and Mathis in France) are at Dearborn for the purpose of ordering equipment for machining a small Ford V-eight engine to be made at the rate of 75 a day at the Mathis factory. This plant already is building 50 of the present Ford V-eight motors a day for the French market.

For the first time in months Chrysler divisions are inquiring for machine tools, mostly in the interests of cutting production costs. Extensive purchases are not anticipated immediately, but with the corporation enjoying the most profitable first half in its history, the management is likely in the next 60 days to loosen its purse strings to achieve obvious economies.

With labor costs higher than in any previous year, including 1929,

(CONTINUED ON PAGE 44)

• THERE IS NO
INVESTMENT

Modern



THE toolroom owning these four basic machine tools is in a strong competitive position. Each is the best of its type, precision built. Each will do its work accurately and faster, at a good profit. Each has proved highly successful in dozens of shops on hundreds of jobs.

Pratt & Whitney Lathes have been well known for over seventy years. All the experience gained in that time, all the knowledge of what a fine lathe must do, is built into the Model B Lathe. Wherever fine lathes are discussed, the Model B is the standard by which all comparisons are made. There are three sizes, each available in several bed lengths.

The Pratt & Whitney 14-inch Hydraulic Vertical Surface Grinder is new in 1935. It introduces for the first time in a toolroom grinder table speeds up to 100 feet a minute. This high speed has resulted in large savings, and has changed grinding practice radically. It is worth knowing about.

The Pratt & Whitney Vertical Shaper is known as the handiest machine in the shop. It will cut all sorts of irregular shapes, often with-



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out a single time-killing change in setup. Its vertical design is a tremendous advantage in many ways. It is available in two sizes.

Pratt & Whitney Jig Borers are ideal for the hundreds of precision boring and light manufacturing jobs which every toolroom must do. These machines, available in several sizes, locate by means of fundamental built-in measuring instruments, which are accurate to "tenths".

The Pratt & Whitney Jig Borer is without doubt the finest piece of precision machine tool manufacturing built today. It changes the difficult job of precision boring into an easy, quick operation.

The Pratt & Whitney Jig Borer is the one machine above all others which a modern toolroom cannot afford to be without.

If you are not familiar with any or all of these famous machine tools, send for the books we show here. In them you will find many facts that every shop executive likes to know about his equipment. Perhaps they will show how your toolroom can be speeded up, or your work turned out with better accuracy, or both. A letter from you will bring copies of any or all four of them promptly.

WHITNEY CO.
CONNECTICUT, U. S. A.



(CONTINUED FROM PAGE 41)

motor car companies are particularly receptive to new machinery operating automatically, including the feeding and discharging of the work, which combines two or more operations formerly done by individual machines. It is this type of equipment, convertible to new jobs at small cost, which is getting close attention.

Plants to Tool Up in August

It seems strange to be approaching the tail-end of an automobile production season around June 1, but that is the situation which faces the industry this year, with the New York show scheduled for Nov. 2. With the possible exception of Chevrolet, which will be busy making up for lost time, all major car companies appear likely to have lower operating rates set up for June. By the middle of August most manufacturers will have cleaned up their 1935 model runs and will be in the midst of tooling up programs. Tool and die shops are looking forward to a busy third quarter.

Little fresh buying of steel for present models is anticipated, except in the way of balancing up stocks to finish output of current cars. Introductions of 1936 lines will be stretched out from the latter part of September until show time. It is possible that initial steel purchases for next year's cars will be made in July, but little volume will develop until August or possibly early September. The next 60 days are not likely to bring out much automotive steel tonnage.

The story has apparently got around again that Ford is not going ahead with its continuous strip sheet mill. This is an erroneous report, as construction work at the Rouge plant is progressing as fast as possible. The hot mill is almost completed, but it probably will be midsummer before the cold mill is ready.

Detroiter Foresee a Future Gary

Enthusiastic Detroiter are again looking into the magic crystal and seeing their city a future Gary as a steel-producing center. Their hope is based on a proposal made to the United States district engineer, by the Port of Detroit Authority the past week, to build an American channel along the west shore of the Detroit River from Ecorse to Monroe, at a cost of \$6,000,000 to \$10,000,000. The navigable channel at present is on the Canadian side. The city plan commission of Detroit has endorsed the project, pointing out that the district along the proposed channel is ideal for industrial purposes.

with a Great Lakes waterway, ample railroads and fine concrete highways. The district engineer is to make a report on the program shortly to Washington. Upon his recommendations hinges the possibility of Federal financing.

Concurrent with the publicizing of this program are fresh reports about the possible erection of new steel mills in the so-called down-river district. Although Detroit has been growing in prominence as a steel consuming and producing center, those familiar with the present situation do not see much promise of a widespread invasion of

the Detroit area by steel companies not already possessing properties here. In order to insure economical manufacturing costs, any large steel company wishing to put a mill here probably would think it necessary to have an integrated plant from ingot to finished products. That would call for tremendous capital outlay. Proof of this point lies in the fact that companies which recently have constructed continuous strip sheet mills or now are in the process of building such mills (aside from Great Lakes and Ford) are putting them adjacent to their own raw steel production outside the Detroit district.

Employee Representation Plans Growing In Favor Among Steel Workers

INCREASING popularity of employee representation plans for collective bargaining in the steel industry is indicated by preliminary results of an industry-wide survey just completed by the American Iron and Steel Institute. The survey reveals active support of such plans by 89.1 per cent of the employees in the operating divisions of 101 companies which employ more than 90 per cent of the wage-earners on the steel company payrolls. The survey covers the entire year 1934.

A limited survey made last summer showed that employee representation plans at that time were supported by 86 per cent of the employees of 35 companies. Despite the fact that 1934 was a year in which relations between employers and employees in many industries were unsettled, the steel industry's employee representation plans are shown by the survey to have settled 15,665 questions in a quiet and orderly manner.

Of the number of question settled, 11,417, or 72.8 per cent, were decided in favor of employees, while 2,574 questions, or 16.4 per cent of the total, were decided against the employees. There were 943 questions, or 6 per cent, in which the result was a compromise, while 731, or 4.6 per cent, were withdrawn. At the end of the year, 647 questions were pending and were carried into 1935 for settlement. These percentages agree closely with the results of the institute's earlier but less comprehensive survey.

Such closely corresponding results are believed to indicate that employee representation plans in the steel industry, some of which

were established many years ago, are fairly and efficiently solving the problems of relations between employees and management of the industry.

More of the questions referred for settlement to joint committees of employees and management representatives related to wages, hours and distribution of work than to any other single subject; questions of safety formed the next largest class of subjects presented, and the third largest group of questions referred to the physical conditions of plant and environment affecting production. A total of 9359 meetings were held by the joint committee of employees and management.

The institute's survey showed that organized employee representation plans were found principally in companies employing a relatively large number of men. Eighty-eight companies, whose combined employment is only 7 per cent of the industry's total, reported no formal plans of collective bargaining. Further analysis revealed that in nearly every instance these companies represent small establishments of long standing in which close personal relationships between employer and employee have developed. Under these conditions, both men and management have not felt that any formal plan of collective bargaining would bring happier results than their present personal relationships.

Less than 2 per cent of steel industry employees were shown by the survey to be bargaining collectively with their employers under other than employee representation plans.



THIS WEEK IN WASHINGTON

Railroading of Wagner Bill through Senate is painful surprise to industry; President's attitude not expressed.

• • •
Wage scales set for work relief projects as allotment of first billion is announced.

• • •
Richberg defends NRA before House Committee in seeking two-year extension asked for by President.

• • •
Large potential steel requirements of airplane industry stressed by air commerce chief.

• • •
Steel code again attacked in Senate; price fixing charged.

hurled short and ugly words at critics of AAA before cheering sons of the soil. . . .

Paid for not growing crops, the visitors found it easy to leave farms in the midst of planting season and enjoy themselves. . . . Funds to pay expenses supposedly came from processing tax emoluments or from a generous and "inexhaustible" federal treasury with its doles to support policy of an economic scarcity. . . . Suspicious members of Congress intimated expenses were defrayed by AAA and got sharp denials. . . . Getting what they wanted the farmers returned to their homes, happy and full of sight seeing. . . . And at that they got no more than many other groups either get or sought. . . .

Farmers Stage March

Well-dressed, prosperous looking, not distinguishable from the "city slickers" who are fortunate enough to be equally as well tailored, 4500 farmers staged a "march"—it is always a march in Washington—and insisted upon continuance of processing taxes. . . . They found a sympathetic Administration whose forces denied they arranged for the invasion. . . . Were greeted by a President who organized a liars' club as from White House south porch he

bitterly fought by industrialists throughout the country, with the steel industry taking a leading part against it. . . . But the voice of industry was as a cry in the wilderness. . . . And the flood of telegraphic protests rushed to Senators as the "debate" proceeded were as a flake of snow in a hot metal bath. . . . Senator Wagner led his forces to a dashing victory and received the plaudits of the American Federation of Labor as its jubilant president, William Green, rushed forward to exclaim "It's a great achievement for labor. We will now concentrate on efforts toward bringing about adoption of the measure by the House and its approval by the President." . . .

Wagner Bill "Railroaded" Through Senate

Organized labor rejoiced as well. . . . The Wagner labor disputes bill was shoved through the Senate after only a few hours of discussion, whereas opponents thought it would require a week or two of debate, protests of its few outspoken critics having been pathetically futile. . . . The bill was

Senators supporting the bill were hardly able to suppress chuckles, as just prior to calling it up, they declared its opponents would be unable to stop its passage because the latter knew so little about it "they could not discuss it intelligently." . . . Watching from the galleries, labor lobbyists were likewise happy over the vain attempts of Senator Tydings, Democrat, Maryland, to put through an

amendment to prohibit "coercion and intimidation" by labor unions, as well as by employers. . . . Contentions that the bill set up the American Federation of Labor as a monopoly to control industry got exactly nowhere. . . . As did many other protests, including that of Senator Tydings who said "It looks as if this is a bill to force every man in America to join a particular union, whether he wants to or not," and who declared that if the Senate did not accept his amendment "talk of freedom for labor is a farce." . . . Senator Hastings, Republican, Delaware, was equally scorned when he insisted the bill was unconstitutional and struck at freedom of minorities. . . .

Industry, again rising in protest as it met crushing defeat at the hands of the Senate, found a strong voice in John E. Edgerton, president of the Southern States Industrial Council, who urged the council's 10,000 members to oppose the "wholly unjust, unnecessary, despicable Wagner labor relations bill." . . . Setting up and greatly strengthening the National Labor Relations Board as the "Supreme Court" of labor, the bill provides for the majority rule through which organized labor hopes to become the sole collective bargaining agency for all industries. . . . It bars "company dominated unions," and organized labor hopes to convince the board that all unions, except its own, are company dominated. . . .

Clark Resolution Also Rushed

In another burst of speed, and this time defiant of the Administration, the Senate previously had pushed through the Clark joint resolution to extend NRA only until April 1, 1936. . . . With only a few hours' debate, the Senate, without record vote, reflected strong hostility to Blue Eagle. . . . Though masked as an attempt to continue NRA long enough to get a Supreme Court ruling on its constitutionality before taking up further legislation at the next session of Congress, Administration forces, industry generally, and organized labor groups insist that the resolution is meant as a death blow at NRA. . . . Chairman Donald R. Richberg, at a "pep" meeting of NRA employees, told them a short extension of NRA was "complete folly." . . . And a few hours later the Senate enacted the "folly" and Senators berated Richberg for his "impudence" in lecturing to the Senate. . . . The doughty chairman of NRA nevertheless has proceeded with a drive to get the Administration's two-year extension bill through the House and got strong support of house leaders, including Chairman Doughton of the

Ways and Means Committee and Speaker Byrns. . . . Yet belligerent Senators insist they will see NRA die on June 16 before they will accept the Administration bill. . . .

Attack Steel Code

Senator Clark assured Senator Shipstead that the latter was right in his understanding "that the steel code be eliminated so far as it concerns price fixing under the so-called 'base-rate' system, the system which is a modification of the former Pittsburgh-plus system." . . . And Senator Harrison assured the Minnesota Senator that "price fixing in the steel industry will not be continued and is not now in the steel code." . . . The Missouri Senator wanted to include a provision against the "base-rate" system in the steel industry, but since the resolution was not to be a permanent law he did not press the point. . . . Strongly bitter toward Mr. Richberg, the Missouri Senator assailed the much harassed NRA chairman for permitting what was called price fixing. . . . Richberg was attacked from other Senatorial sources as reports of his pending resignation were spread. . . . He pointed out, however, that he accepted the NRA chairmanship with the understanding that he would remain with NRA only through its "transition" period and that he "would appreciate it" if he could retire to private law practice in Chicago by July 1. . . . This understanding, it was stated, was made with the President when latter shifted Richberg from his job as super-coordinator to head of NIRB. So Mr. Richberg soon will leave the NRA and the steel code authority. . . . Others about ready to leave NRA are Administrative Officer W. Averhill Harriman and Control Officer James F. O'Neill, who await determination of NRA'S future. . . . The rank and file of employees, fearful that NRA'S future will be short-lived, are in a state of demoralization. . . .

President Irritated By AAA Critics

President Roosevelt's bitter attack on AAA critics came as a surprise because of what was called a remarkable display of irritability. . . . But the surprise was more than matched by his announcement that he would go before Congress and read the message vetoing the Patman bonus bill, an outright inflationary measure with its two billions of dollars (in greenbacks). . . . Unprecedented, this Presidential move aroused admiration as one of genuine courage. . . . And, at that, the view is widely expressed that, reducing the matter to blunt political terms, it will bring the President more votes

than it will take from him. . . . And, it is hoped, serve notice that raids on the treasury are at an end—a hope that perhaps is naive.

Morgenthau Adds Final Touch

As a final touch to the topsy-turvy scene, Secretary of Treasury Morgenthau even outdid Governor Eccles of the Federal Reserve Board and told the Glass subcommittee on Banking and Currency he thought the Government should own the stock of Federal Reserve banks and that it was fundamental that the Government should control the instruments of credit. . . . The Eccles bill at least would leave ownership of the 12 reserve banks with the members banks of the system, though there would be tremendous Governmental influence over them. . . . Giving the Morgenthau expression more weight, was the declaration that it had Presidential approval.

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Quoddy Makes the Hurdle

Maine went New Deal last fall. So did most of the remainder of the country. Which may or may not—probably may not—confirm the old saw that "as Maine goes so goes the country." Anyhow New Dealers are grateful. So say Republican opposition, at least. And it is this gratitude, say the "outs," that put Quoddy over the hurdle. In the spring of 1934, when even New Dealers were said to think Maine was hopelessly Republican, the PWA turned Quoddy down with hot scorn. Engineers reported to PWA that Quoddy was not practical. Most everybody by now knows this political term is short for Passamaquoddy Bay.

But Quoddy is to be harnessed and turned into electrical energy. The Advisory Committee on Allotments has recommended an initial outlay of \$10,000,000 for the project. Coming with it was what has been described as an alibi to explain the change about face. The committee said the project is in different form from that considered by PWA. The principal change is omission from plans of a provision for the erection of two privately owned stainless steel plants.

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Iron and Steel and Mineral Divisions Consolidated

The Iron and Steel and the Mineral divisions of the Bureau of Foreign and Domestic Commerce were consolidated last week and the combined unit is known as the Metals and Minerals Division. R. L. Harding, who was chief of the

Iron and Steel Division, was made chief of the consolidated divisions. R. L. Lund, who has been acting chief of the Minerals Division, has been made chief of the Minerals section.

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Girdler Points Out Steel Consumption Potentialities in Houses

Tom M. Girdler, chairman, Republic Steel Corp., together with N. J. Clarke, vice-president in charge of sales for Republic, and L. S. Hamaker, vice-president and general manager of the Berger Mfg. Co., Republic subsidiary, attended the erection of the second Berloy steel frame house at Bethesda, Md., last Wednesday. The steel frame was started at 10:30 in the morning and when the party arrived later in the afternoon the first floor was entirely completed.

Commenting on the potential market for steel which houses of this type would create, Mr. Girdler said:

"There is an immediate demand for more than 2,000,000 new homes in the United States. Figuring five tons of steel to a house, this represents some 10,000,000 tons. In addition, houses such as we have developed will mean a large demand for traditional building materials such as brick, lumber, plaster and others."

Mr. Girdler pointed out that an investment of over \$8,000,000,000 will be required to meet the nation's housing shortage and mean the employment of from 3,000,000 to 4,000,000 men. For every thousand men employed in the actual building of houses, it was stated, another thousand is employed in the preparation of the materials.

Mr. Girdler commented on the fact that steel barns, silos, etc., of the type now being manufactured by the James Mfg. Co., Fort Atkinson, Wis., Republic subsidiary, will fill an important place in the business layout of the farmer. It was stated that literally millions of tons of sheet steel can be utilized for this purpose.

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Complete Review of Iron and Alloys Under Way

The Engineering Foundation through its alloys of iron committee has undertaken the preparation of a series of monographs which collectively will constitute a complete and critical review of available information in regard to iron and its alloys.

A review, "The Metal—Iron," under authorship of H. E. Cleaves and J. G. Thompson, will be published by the alloys of iron committee in about two months.

First Billion of Works Relief Fund is Allotted—Wage Rates Established

WASHINGTON, May 21.—In an executive order issued yesterday, President Roosevelt established wage rates ranging from \$19 to \$94 a month for the workers on most of the projects which will be undertaken by the Federal Government in its \$4,000,000,000 work-relief program.

Maintaining the principle of paying less than the rate prevailing in private industry, the President based his schedule of "monthly earnings" upon a division of the country into four wage areas in accordance with the existing wage structure. Present regional differentials are thus to be reflected in the work relief payments. In addition, the wage scales take account of differences between rural and urban compensation and among four different types of work: unskilled, intermediate, skilled and professional or technical employment.

For a county in Region No. 1, consisting of 23 northeastern States, whose principal municipality had a population in 1930 of more than 100,000, unskilled workers will get \$55 a month, intermediate workers, \$65; skilled workers, \$85, and technical workers, \$94. The lowest pay will go to workers in counties whose largest cities had a population of less than 5000 and are embraced in the region formed by seven States of the South. In that group unskilled workers will get only \$19 a month; intermediate workers, \$27; skilled workers, \$35, and professional and technical workers, \$39.

First Allotments Last Week

The Advisory Committee on Allotments last Thursday announced its recommendation to the President for the allotment of \$1,091,200,000. This sum was proposed to be set aside for various items of non-Federal projects, highway construction, grade separation, projects being carried forward by the Corps of Engineers, for the Resettlement Administration and for the housing division.

Allotments to the Bureau of Public Roads, totaling \$500,000,000, were recommended. The segregation provided \$200,000,000 for highway, road and street construction; \$200,000,000 for grade separations and \$100,000,000 for previously incurred obligations under the Hayden-Cartwright Act of

1934. Hence the outlay for new construction is \$400,000,000.

The Corps of Engineers, United States Army, was allotted \$102,186,500 for general projects and \$10,000,000 for the Passamaquoddy power project in Maine. Included in the first amount set aside for the Corps of Engineers was \$25,000,000 for the Mississippi River between the Missouri River and Minneapolis and \$10,000,000 for the Missouri River between Kansas City, Mo., and Sioux City, Iowa.

Recommendation was made for Federal participation to the extent of \$100,000,000 in a program sponsored by Wisconsin, embracing 140 varied projects, estimated to cost \$205,714,425. The allotment would be conditional upon Wisconsin's raising the remainder of the necessary funds, upon its arranging to repay to the Government \$30,000,000 of the \$100,000,000 and upon the State enacting satisfactory enabling legislation.

A series of housing projects scattered widely over the country and involving a total of \$249,860,000 were approved.

Start Highway Work Immediately

It is hoped to start highway construction, grade crossing elimination and housing projects within the near future, perhaps some time early in June, it was stated. Steel for these projects, it also was declared, ought to be reaching mills within six weeks or two months.

The Resettlement Administration was allotted \$100,000,000 for its program without awaiting rules and regulations. It is reported that Dr. Rexford Guy Tugwell, head of the rural resettlement division, already has begun acquiring land in which to place needy families.

Recommendation was made for an allotment of \$7,500,000 towards a \$25,245,000 project in New York, covering construction in connection with the Ward's Island sewage treatment plant and intercepting sewers in Manhattan, the Bronx, with grit chambers and tunnels to the treatment plant. The allotment suggested would be made under a plan of a 70 per cent loan and 30 per cent grant.

Allotment of \$20,000,000 was recommended for the Lower Colorado River project in Texas. An allocation to the Alaska Road Commission for highway construction of \$446,500 was also recommended.

Hurried Passage of Wagner Bill by Senate Shocks Industry

WASHINGTON, May 21.—The amazing ease with which the Senate passed the Wagner labor disputes bill last Thursday came as a distinct surprise to industrialists of the country who have so strongly opposed the measure. It was passed after only a few hours' discussion by the overwhelming vote of 63 to 12, and the feeble protests raised against it were crushed without being given even scant consideration. Telegraphic protests which reached the Senate floor as the bill was being rushed through met with the same fate.

With this headlong dash to passage, House supporters of the Connery bill, identical to the Wagner bill except in one respect, hurried to get into touch with the White House to determine the President's attitude toward the legislation. They expressed the utmost confidence that the Connery bill would go through the House as easily as the Wagner bill went through the Senate. The only difference between the two bills is that the Wagner bill sets up the National Labor Relations Board as an independent body while the Connery bill would place it under the Department of Labor.

Protests Numerous

Telegraph wires hummed with a flood of protests from employers in innumerable industries, chambers of commerce and other business organizations after announcement of passage of the Wagner bill was made. They were directed to members of the House and of the Senate and it is reported that many were sent to the White House. Arrangements for protest meetings throughout the country were made. Likewise similar moves in support of the bill were made by labor organizations, thus once more bringing feelings over the bill to a white heat.

Repeated warnings from business interests that the Wagner bill would bring on strikes and violence and widespread unrest, with indefinite postponement of economic recovery, were sent to Washington. On the other hand, organized labor forces have repeatedly insisted that failure of the legislation would bring about strikes and general strife, despite the fact that it represents less than 10 per cent of the employees of the country.

President William Green of the

American Federation of Labor was elated over the Senate action and proceeded at once to line up the House to pass the legislation. It was freely predicted it would require no lining up unless checked by some unexpected development such as White House objection. There were reports that House leaders might use the Wagner-Connery bill as a vehicle for trading with the Senate. The suggestion was made that the House leaders might inform the Senate that unless the latter accepted the Administration NRA bill, the House would decline to pass the Wagner-Connery bill. These reports, however, have been given little credence.

One reason given for the quick

passage of the bill in the Senate is that some who voted for it on political grounds were confident it would be held unconstitutional when brought before the Supreme Court, as it is believed it inevitably will be. On the other hand, some prominent Senators who were most active in its passage said it was passed because opponents did not understand it sufficiently to discuss the bill intelligently.

In vain, Senator Tydings, Democrat, of Maryland, offered an amendment to prohibit "coercion and intimidation" by labor unions. His contention that the bill looked as though it was intended to force workers to join a particular union, "whether they wanted to or not," and that refusal to accept his amendment made talk of freedom of labor a farce, got him nowhere. Nor did it mean anything to the Senate when Senator Hastings, Republican, Delaware, said the bill was unconstitutional and struck at the freedom of minorities.

Aircraft Developments Source of Large Potential Steel Requirements

WASHINGTON, May 21.—So fast has the American air transport system developed that it must be compared with those of all European nations combined. This fact was pointed out by Eugene L. Vidal, director of air commerce, Department of Commerce, in an address at Newark, N. J., in connection with observance of Air Transport Day. Back of this statement are seen possibilities for large requirements of steel, both alloy material and the regular commercial grades, the former in particular for airplane construction and the latter for terminals, hangars, lighting equipment, etc.

Indicative of the growing use of steel in airplane construction were two announcements made the past week by Mr. Vidal. One related to a contract made by the Bureau of Air Commerce for a low-wing, all-metal, two-place cabin monoplane, which is being added to the various types of new airplanes which the Bureau is purchasing. The contract was awarded to the Curtiss-Wright Airplane Co., Robertson, Mo.

Another announcement said that a solid steel airplane propeller of a new type which holds promise of increased efficiency and lowered manufacturing costs will be built for the Bureau. Under a contract with Ernest G. McCauley, Dayton,

Ohio, five of the propellers are to be delivered on or before Sept. 30. They are intended for use in airplanes of a new design which are being constructed for the Bureau.

According to John H. Geisse, chief of the Bureau's development section, the new propellers will be thinner than types now used and the cross-section will be of a different shape.

"Tests already made indicate that these propellers will be slightly more efficient than other propellers," said Mr. Geisse. "Also, we believe that the new shape will bring about an improvement in cooling of the engine. The blades and hubs are to be machined from die forgings, and once the necessary shop machinery has been set up, costs should be less."

The contract for the all-metal plane placed with the Curtiss-Wright company represents an investigation of the possibilities of metal construction, Mr. Geisse said, including stressed skin construction (in which the metal covering of wings and other components carries some of the flight load) in designing for private owners.

A previous invitation for bids attracted several designs which, although not fully meeting the specifications, according to Mr. Geisse, did come very closely to meeting them, and in addition had

characteristics in which the Bureau was interested.

"The Bureau was particularly interested in those which were of all-metal construction," he said. "A second invitation for bids therefore was issued which called for all-metal construction and eliminated certain other factors in the original specifications."

Despite progress made in the American air transport system, Mr. Vidal said, it has just begun. Its economies are just as encouraging, he pointed out, since revenues can be increased by larger

planes and operating costs can be reduced by increased speed and improved construction. In the matter of speed, Mr. Vidal explained that just recently a transport plane similar to ones used on air lines crossed the country in about 11 hr., less than one-fourth the elapsed schedule time of the 1929 service. It appears feasible at this time, he declared, for pilots and mail soon to fly from coast to coast at 35,000 ft., well above the storms, in less than 7 hr. The same type of plane, Mr. Vidal added, could fly to Europe in almost as short a period.

Richberg Defends NRA in Fight in House for Two-Year Extension

WASHINGTON, May 21.—The break between the Administration and the Senate over extension of the National Industrial Recovery Act became sharply defined at hearings begun yesterday before the House Committee on Ways and Means. Simultaneously volumes of protests came to members of Congress from industries throughout the country as they organized support of the Administration measure to continue the act two years and in opposition to the Clark resolution, passed by the Senate, continuing the act only 9½ months. Going further, the General Committee of Industry and the Business Committee for NRA Extension were preparing to demonstrate opposition to the Clark resolution at a meeting of business interests called for tomorrow.

Leading the attack on the Clark resolution and support of the Administration bill at the Ways and Means Committee hearings was Donald Richberg, NRA chairman. Mr. Richberg, while stating he was in sympathy with the purpose of the Clark resolution to continue NRA with definite restrictions as to intrastate commerce and price fixing, declared, however, that he was also convinced that the provisions of the resolution are unworkable and inadequate to accomplish its declared intention. He said that the effect of an extension of only 9½ months, even without amendments, would be demoralizing because it is necessary anyhow to revise many of the codes and their administration and to limit the activities and improve the efficiency of NRA in the light of experience and to meet just criticisms.

An extension of two years was

declared to be absolutely necessary. Among reasons given for his position, Mr. Richberg said it was necessary to prevent the entire breakdown of labor and fair trade practice provisions by chiselers who are already at work undermining the standards of fair competition.

"The extension of the NRA for a few months, with the added burden of necessary code revision made impossibly difficult by vague and sweeping amendment, will simply bring rapid deterioration and disintegration of the whole recovery program," said Mr. Richberg.

NRA, he said, is entirely in accord with the evident desire on the part of Congress to forbid any monopolistic price-fixing and to confine the exercise of Federal authority strictly within the constitutional power of the Federal Government to regulate interstate commerce. He said, however, that the provisions that "no price fixing shall be permitted or sanctioned under the provisions of any code" furnishes only a vague and confusing standard for administrative action. Literally, he pointed out, it forbids anyone operating under a code to fix the prices of the goods he sells. The phrase, "price fixing," by itself, it was stated, does not mean either "price fixing by private agreement," or "price fixing by Governmental action" but covers the fixing of a price by anyone, including the producer or seller of an article.

"One of the chief methods of monopoly, one of the major 'monopolistic practices,' which codes of fair competition are designed to prevent, is the practice of destructive price cutting and

price discrimination," said Mr. Richberg. "In this way a big corporation with large financial resources may destroy its small competitors in a price war by taking away business and driving them into bankruptcy. Is it illegal 'price fixing' in a code to prohibit such a monopolistic practice?"

Mr. Richberg told the committee that if it is the purpose of the amendment to prevent producers or distributors from fixing prices by agreement so as to maintain an artificial price level, that intention should be clearly stated. He also assailed as a vague and unworkable standard for administration, the provision that "no code of fair competition shall be applicable to any person whose business is wholly intrastate." He pointed out that the codes apply to trades and industries as a whole and regulate the conduct of those engaged in them. The codes, said Mr. Richberg, should not apply to trades and industries that are wholly intrastate in their operations or effects. It was stated that a "loose and vague phrase of this character opens the door to universal evasion of code requirements and would subject all bona fide interstate operations to the unfair competition of any person who could claim that his business was 'wholly intrastate'."

Hearing on Die Casting Code Revision June 7

WASHINGTON, May 21.—The NIRB has announced a public hearing on Sections 8 and 9 of Article VIII of the die casting manufacturing industry code, to be held June 7, at the Washington Hotel, to determine whether these sections of the code should be stayed.

Complaints have been received by the Board that these sections are contrary to the policies of the National Industrial Recovery Act and are a burden on certain members of the industry.

The sections are:

Section 8. To quote on die castings to be produced from dies in the possession of another die caster.

Section 9. To quote prices on castings without quoting a separate charge which covers the cost of constructing the necessary dies and tools required for the production of such castings.

Spring Leaf Manufacturing: The NIRB has approved an amendment to the code of fair competition for the leaf spring manufacturing industry, a product group of the original equipment and replacement parts division of the automotive parts and equipment manufacturing industry, to permit open price filing in the industry.

PRODUCTION OF PIG IRON AND FERROALLOYS IN THE UNITED STATES IN 1934 (Gross Tons)

(American Iron and Steel Institute)

All pig iron and ferroalloys are included, whether made in blast furnaces or in electric furnaces. Ferroalloys include ferro-manganese, spiegeleisen, ferro-silicon (containing 7 per cent and over of silicon), ferro-phosphorus, ferro-vanadium, ferro-chrome, etc.

PRODUCTION OF PIG IRON AND FERROALLOYS (By States)

Pig Iron:	1930	1931	1932	1933	1934
Pennsylvania	9,967,618	5,037,672	2,103,180	3,728,839	4,244,566
Ohio	6,688,658	4,120,610	2,387,028	3,918,723	4,207,944
Indiana, Mich.	3,934,212	2,327,839	1,034,801	1,469,783	2,184,546
Illinois	3,344,631	1,964,735	919,250	1,012,676	1,269,154
Alabama	2,382,221	1,640,851	652,898	900,170	1,171,650
Mass., New York	2,008,812	1,149,677	624,141	665,928	1,053,257
Md., Va., W. Va., Ky., Tenn.	1,922,314	1,419,987	680,774	1,143,600	1,318,964
Minn., Iowa, Colo., Utah	772,441	296,408	147,562	161,000	226,808
Total	31,020,907	17,957,779	8,549,664	13,000,719	15,676,889

Ferroalloys:						
Pennsylvania	337,268	195,552	85,194	163,798	164,776	
New York, N. J.	202,622	125,597	85,875	98,857	140,711	
Ohio, Ill., In., Colo.	148,492	89,352	41,510	63,386	116,402	
Md., Va., W. Va., Ala., Tenn.	42,880	58,074	19,210	18,842	39,795	
Total	731,262	468,575	231,789	344,883	461,684	
Grand total	31,752,169	18,426,354	8,781,453	13,345,602	16,138,573	

PIG IRON MADE FOR SALE IN 1934 (By Grades and By States)

States	Bess.		Mal-	All		Total
	Basic	Phos.		Foundry	leable	
N. Y.	96,678	64,867	210,454	162,404	2,141	536,544
Pennsylvania	128,994	81,936	151,976	68,481	16,833	448,220
Md., W. Va., Ky., Ala., Tenn.	72,690	6,177	524,899	....	1,779 11,549	617,094
Ohio	232,124	21,244	162,232	308,779	....	724,379
Ind., Illinois	122,157	4,363	16,966	135,331	....	278,817
Mich., Iowa, Colo., Utah	1,869	....	53,399	....	3,392	58,660
Total	654,512	178,587	1,119,926	674,995	20,753	14,941 2,663,714

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON AND FERROALLOYS

States	Blast Furnaces (a)				Production—Gross Tons	
	In Blast		June Dec. 31, 1934			
	June 30, 1934	Dec. 31, 1934	First Half of 1934	Second Half of 1934		
Mass.	0	0	1	1	644,348	
New York	6	4	14	18	408,909	
Pennsylvania	23	16	64	80	2,658,638	
Maryland	3	3	3	6	1,585,928	
Virginia	0	0	5	5	4244,566	
West Virginia	3	2	1	3	815,529	
Kentucky	2	1	1	2	503,435	
Tennessee	0	0	4	4	1,318,964	
Alabama	10	6	15	21	766,271	
Ohio	25	18	35	53	405,379	
Illinois	6	5	20	25	1,471,096	
Indiana	6	5	13	18	538,009	
Michigan	6	5	3	8	1,269,154	
Minnesota	0	0	3	3	982,221	
Iowa	0	0	0	0	2,184,546	
Missouri	0	0	1	1	113,911	
Colorado	1	0	3	3	112,897	
Utah	1	1	0	1	226,808	
Total pig iron.	*92	*66	*186	*252	9,669,015	
Total ferroalloys	6	2	15	17	6,007,874	
Grand total....	98	68	201	269	15,676,889	

(a) Completed and rebuilding pig iron furnaces. *Furnaces making pig iron regularly. Furnaces making ferroalloys regularly not included. †Blast furnaces only. Electric furnaces not included. ‡Includes ferroalloys made in electric furnaces.

HALF-YEARLY PRODUCTION OF PIG IRON BY GRADES AND FERROALLOYS BY KINDS

BASIC PIG IRON

States	First Half of 1934	Second Half of 1934	Total 1934
New York	367,913	187,462	555,375
Pennsylvania	1,708,437	1,024,694	2,733,131
Maryland, West Va., Kentucky, Ala.	1,044,459	619,756	1,664,215
Ohio	1,568,321	810,527	2,378,848
Indiana, Illinois	1,184,884	869,270	2,054,154
Michigan, Colorado, Utah	373,678	342,343	716,021
Total	6,247,692	3,854,052	10,101,744

BESSEMER AND LOW-PHOSPHORUS PIG IRON

States	First Half of 1934	Second Half of 1934	Total 1934
Pennsylvania	766,525	489,773	1,256,298
New York, Md., W. Va., Alabama	277,157	95,858	373,015
Ohio	812,772	462,443	1,275,215
Indiana, Illinois	335,401	191,360	526,761
Total	2,191,855	1,239,434	3,431,289

FOUNDRY PIG IRON

States	First Half of 1934	Second Half of 1934	Total 1934
New York	231,512	160,321	391,833
Pennsylvania	320,437	222,014	542,451
Kentucky, Tennessee, Alabama	85,993	84,587	170,580
Illinois, Michigan, Colorado, Utah	53,745	106,565	160,310
Total	691,687	573,487	1,265,174

MALLEABLE PIG IRON

States	First Half of 1934	Second Half of 1934	Total 1934
New York	148,166	86,940	235,106
Pennsylvania	263,301	116,040	379,341
Ohio	94,037	118,667	212,704
Total	505,504	321,647	827,151

FERROALLOYS BY KINDS

Ferroalloys	For Sale	Use	Total
Ferromanganese and spiegeleisen	90,516	95,317	185,833
Ferrosilicon	150,438	89,527	239,965
Other ferroalloys	16,987	18,899	35,886
Total	257,941	203,743	461,684

PRODUCTION OF PIG IRON AND FERROALLOYS IN 1934 (For Sale and for Maker's Use)

Pig Iron:	For Sale	Use	Total
Basic	654,512	9,447,232	10,101,744
Bessemer and low-phosphorus	178,587	3,252,702	3,431,289
Foundry	1,119,926	145,248	1,265,174
Malleable	674,995	152,156	827,151
Forge or mill	20,753	57	20,810
White and mottled, direct castings, etc.	14,941	15,780	30,721
Total	2,663,714	13,013,175	15,676,889

Ferroalloys:	For Sale	Use	Total
Ferromanganese and spiegel	68,954	116,879	185,833
Ferrosilicon	234,526	5,439	239,965
Other ferroalloys	35,452	434	35,886
Total	338,932	122,752	461,684

Grand total....	3,002,646	13,135,927	16,138,573
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PRODUCTION OF RAILS IN THE UNITED STATES IN 1934 (Gross Tons)

PRODUCTION OF RAILS IN 1934

(By Weight per Yard and by Processes)

	60 and 85 and	100 and	120 and	136
	Under Less	Less	Less	Lb.
	60	85	100	120
Open-hearth	41,934	17,111	73,639	491,642
Bess. and electric	2,032	....	....	2,032
All other	26,119	....	....	26,119
Total	70,085	17,111	73,639	491,642

	325,942	31,805	1,010,224
	1,010,224	100.00	100.00

PRODUCTION OF RAILS IN 1933 AND 1934

(Increase by Processes)</p

Production of Rails in United States in 1934 (Continued)

NUMBER OF WORKS ROLLING RAILS IN 1934

—Of These the Following Rolled—

Open-Hearth

States	Total Active Works	Rolled				Year	Bessemer			Year	Bessemer		
		From Ingots	From Seconds, Etc.	From Electric	From Old Rails		Open-Hearth	Other	Total		Open-Hearth	Other	Total
New York	1	1	0	0	0	1920	563,869	184,327	748,196	1928	677,801	17,383	695,184
Pennsylvania	5	4	1	2	1	1921	58,406	88,978	679,384	1929	744,526	19,155	763,681
Maryland	1	1	0	0	0	1924	645,916	55,176	701,092	1932	100,694	3,203	103,897
West Virginia	1	0	0	0	1	1925	675,500	30,328	705,833	1933	149,390	4,752	154,142
Alabama	3	3	0	0	0	1926	789,400	40,468	829,868	1934	297,380	10,536	307,916
Ohio	2	1	0	0	1	1927	730,362	21,950	752,312				
Indiana	2	2	0	0	0								
Illinois	1	1	0	0	0								
Colorado	1	1	0	0	0								
Total	17	14	1	2	3								

PRODUCTION OF RAILS (BY WEIGHT PER YARD)

Year	50 and Less				85 and Less				100 and Less				120 and Less															
	Under 50 Lb.	Than 85 Lb.			100 Lb.	Than 120 Lb.			136 Lb.	136 Lb. and Over			Total	Year	Bessemer													
		From Ingots	From Seconds, Etc.	From Electric		From Ingots	From Seconds, Etc.	From Electric		From Ingots	From Seconds, Etc.	From Electric			From Old Rails													
1920	489,043	433,333	952,622	729,119	2,604,116	1920	2,312,750	21,472	143,196	126,698	2,604,116	100,910	12,216	1921	2,178,818	89,162	6,276											
1921	211,563	214,936	902,748	849,566	2,178,818	1921	2,019,988	7,227	55,564	96,039	2,178,818	89,162	6,276	1922	2,032,004	996	22,317	116,459	2,171,776	128,878	3,163							
1922	265,541	274,731	728,604	902,900	2,171,776	1922	2,032,004	996	22,317	116,459	2,171,776	128,878	3,163	1923	272,794	300,907	864,965	1,465,850	2,904,516	17,201	25,995	139,742	2,904,516	130,056	2,142			
1924	191,046	213,274	853,431	1,175,581	2,433,322	1924	2,295,755	11,778	16,069	109,730	2,433,322	85,533	5,167	1925	163,607	219,648	765,371	1,636,631	2,785,257	12,287	9,687	83,747	2,785,257	98,620	4,009			
1926	197,260	256,287	797,662	1,966,440	3,217,649	1926	3,098,776	9,216	12,533	97,124	3,217,649	116,374	4,216	1927	161,836	173,257	539,445	1,314,424	617,524	2,806,486	5,578	1,566	87,055	2,806,486	99,621	1,265		
1928	134,197	125,726	465,393	1,203,749	718,428	1928	2,573,608	6,533	3,156	64,196	2,647,493	113,150	6,453	1929	141,362	102,944	409,628	1,233,599	834,605	2,722,138	10,766	4,209	55,766	2,722,138	109,678	1,965		
1930	95,626	81,299	267,879	835,496	592,933	1930	1,829,143	5,790	2,182	36,118	1,873,233	69,814	4,687	1931	50,089	25,524	123,398	495,752	462,988	1,157,751	1,132,433	3,118	828	21,372	1,157,751	44,652	533	
1932	16,655	13,705	28,593	215,091	128,522	1932	402,566	1,132,433	3,118	64	9,488	402,566	29,003	565	1933	*49,116	*15,413	40,973	154,007	156,787	416,296	388,420	9,372	300	18,204	416,296	17,561	437
1934	*70,085	*17,111	73,639	491,642	325,942	31,805	1,010,224	970,428	11,645	2,032	26,119	1,010,224	29,988	1,598														

*Under 60 lb. per yard. †60 and less than 85 lb. per yard.

PRODUCTION OF RAILS IN PENNSYLVANIA

Bessemer Open-Hearth and All Other

—Open-Hearth and All Other

Bessemer Open-Hearth and All Other</p

Urge High Merchandising Standards in Controlling Foreign Trade in Scrap

THE maintenance of the highest possible merchandising standards in the business of scrap iron and steel exportation was urged by R. L. Harding, chief of the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce, in an address before the Scrap Importers Conference at a meeting in New York, May 21. After reviewing the rapid growth of the scrap export trade in the last few years, Mr. Harding outlined two factors which must be kept in mind in any discussion of the economic soundness of exporting such considerable amounts of old material.

"First," he said, "it is quite evident that a large share of our exported material is collected in the immediate vicinity of the port from which it is shipped and that these areas are too far removed from the centers of our steel industry to make the scrap economically available for use in our own steel production. Second, we are coming more and more to realize that a huge volume of potential scrap iron and steel has accumulated in our factories and industrial plants during the past six years of business and industrial stagnation. The turnover period on some types of equipment in certain industries is as little as five years and inevitably, as we return to a position of more active industrial production in this country, great quantities of machinery will be scrapped and replaced by the more modern and efficient equipment which technology has developed during the comparatively idle period.

"If at any time a serious shortage of scrap should threaten in this country, one of the first natural reactions would be an increase in its domestic price. This in turn would broaden the areas of collection and open up new rural sources of supply which as yet have been little worked. Just how much the increase in price would have to be to check the exports of scrap is debatable, but certainly the present difference between its price and that of the pig iron it replaces leave ample room for any adjustment that may be desirable.

"If the scrap export industry does that it will establish itself in the very front rank of industry, here and abroad. I believe, therefore, that it would be definitely constructive, as well as protective of your best interests, to actively cooperate in an effort toward maintaining the highest possible merchandising standards in all of your dealings."

Carnegie Names Irwin Concrete Bar Head

O. W. IRWIN has been appointed manager of concrete bar bureau, Carnegie Steel Co., Pittsburgh, effective June 1. He has been associated for many years with Truscon Steel Co. as vice-president in charge of the reinforcing bar and steel joist departments, and has been active in trade associations, having helped organize both the Concrete Reinforcing Steel Institute and the Steel Joist Institute. He served as president of the former group from 1931 to

1933 and secretary of the latter institute for several years. He also has been active in the formation of codes for reinforcing materials, steel joists and wire reinforcement, as well as with the code authority of the reinforcing materials fabricating industry. He attended Wooster College and is a graduate of Case School of Applied Science. He is a member of Concrete Institute, American Society of Civil Engineers and other organizations.

New Bulkhead System For Tanker Tested

A DESTRUCTIVE test of a scale model of a new type of bulkhead system for oil tankers was witnessed by the representatives of 50 or more ship building and operating companies at the plant of the Lukens Steel Co., Coatesville, Pa., May 21.

The model buckled at a 131-ft. head of water, the limit of hydrostatic test facilities available, but there were no fractures or weld failures. A 48-ft. test head is required to meet American Bureau of Shipping requirements for tank construction.

The new bulkhead system, fabricated by welding, is expected to provide several structural advantages at no greater cost than the conventional design. Total weight is reduced about 26 per cent and the required stiffener area is some 30 per cent less. The total number of parts has been reduced 32 per cent, and the number of parts to be assembled in the shipyard is 60 per cent less than usual. There is also a reduction, about 40 per cent, in the length of welding at the shipyard.

Pipe Lines

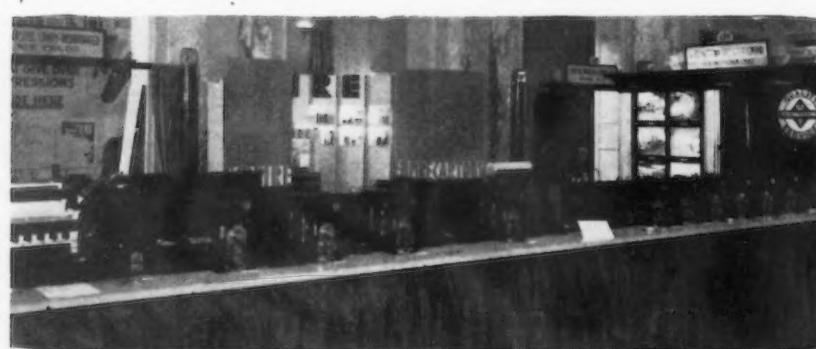
Petroleum Transportation Co., Mount Pleasant, Mich., recently organized affiliated with Consumers Power Co., Jackson, Mich., plans welded steel pipe line in Mecosta-Montcalm counties gas field, for natural gas supply for last noted utility. Consumers company will extend steel pipe lines to use output at Midland, Bay City, Saginaw and vicinity.

Fort Smith, Ark., will ask bids early in June for about 23 miles of steel pipe, with alternate bids on cast iron and concrete, for main water lines. Fund of \$1,500,000 has been arranged for this and other municipal waterworks construction. W. R. Holway, Tulsa, Okla., is consulting engineer.

Bureau of Reclamation, Denver, will soon purchase welded plate-steel penstock pipes, $4\frac{1}{2}$ ft. diameter and 18 ft. long for Grand Coulee, Wash., dam and power project. R. F. Walter is chief engineer, Denver; F. A. Banks, Almira, Wash., is construction engineer.

United States Engineer Office, Louisville, will soon take bids for steel pontoon pipe for project on lower Ohio River.

Cortex Oil Co., Fort Worth, Tex., plans new welded steel pipe line from point near Mercedes, Tex., in recently opened Hidalgo County oil field to Port Isabel, for crude oil. Cost close to \$500,000. It is scheduled for completion late in August.



THIS complete working model of the Youngstown Sheet & Tube Co.'s new continuous hot strip mill is operating this week at the company's exhibit at the National Association of Purchasing Agents' convention at the Waldorf Astoria Hotel, New York. The model literally reduces tiny lead slabs to sheets. Erected on a scale of $\frac{3}{4}$ in. to the foot, the model is 26 ft. long, and reduces toy slabs of metal from $\frac{1}{4}$ in. to $\frac{1}{32}$ in. in thickness. It depicts the entire course of steel through the gigantic machines, lacking only furnace heat and the high pressure lubricants employed in the mill.

Import Problem Discussed at Steel Warehouse Meeting

AGROWTH in enrollment to 275 active members and 38 mill associates was reported at the twenty-sixth annual convention of the American Steel Warehouse Association, held at Chicago from May 14 to 16. The attendance established a record. The question of foreign steel was very much alive, but the discussion centered not on alloy, tool and special steels but on soft steel products, which represent the real tonnage, and which are said to be subject to underselling and unfair trade practices.

Much complaint was heard regarding marking foreign steel, bundle tagging being ineffective and end marking being circumvented by ordering steel over length and shearing off the ends. As an alternative it was proposed that American mills mark all their products and thereby distinguish them from foreign steels. Ware-

New Officers

President, Lester Brion, Peter A. Frasse & Co., Inc., New York.
Vice-president, E. D. Graff, Joseph T. Ryerson & Son, Inc., Chicago.
Vice-president, Ray D. Love, Betz-Pierce Co., Cleveland.
Vice-president, Charles Heggie, Scully Steel Products Co., Chicago.
Vice-president, J. F. Rogers, Beals, McCarthy & Rogers, Buffalo.
Vice-president, A. C. Castle, A. M. Castle & Co., Chicago.
Vice-president, C. C. Dodge, George F. Blake, Inc., Worcester, Mass.
Treasurer, R. J. Stayman, Jones & Laughlin Steel Corp., Pittsburgh.

New Directors At Large

Lester Brion, Peter A. Frasse & Co., Inc., New York, three-year term.
C. C. Dodge, George F. Blake, Inc., Worcester, Mass., three-year term.
Charles Heggie, Scully Steel Products Co., Chicago, three-year term.
Walter Kurtz, Peninsular Steel Co., Cleveland, two-year term.
Harold B. Ressler, Joseph T. Ryerson & Son, Jersey City, N. J., two-year term.
J. F. Rogers, Beals, McCarthy & Rogers, Buffalo, two-year term.
E. D. Graff, Joseph T. Ryerson & Son, Chicago, one-year term.
J. J. Hill, Jr., Hill, Chase & Co., Philadelphia, one-year term.
E. L. Parker, Edgar T. Ward's Sons Co., Pittsburgh, one-year term.



LESTER BRION
New President

houses are actively seeking relief from imports, which in 1934 totaled over 400,000 tons and reduced American workers' earnings by \$11,000,000.

The trade has been too prone to view this problem as one affecting only seaboard areas. Foreign steel is penetrating 400 to 500 miles inland from tidewater and its volume is a flood compared with the total of a few years ago. It is merchandized by people who give warehouse service and it retails from \$15 to \$25 a ton under domestic steel. Previous to the Belgian trade agreement steel from that country was put down, duty paid, in New York at \$1.65 per 100 lb., but now that price has been lowered and there is danger that foreign steel will be barged on our rivers and waterways and thereby become a menace to warehousemen over most of the United States.

Warehouses on the Eastern seaboard could handle 150,000 tons of foreign steel a year, but they are reluctant to go into that kind of business. Prices filed by domestic steel mills prohibit protection in that direction. Of immeasurable help would be Congressional action resulting in a \$20 a ton tariff, as on copper. However, the present Administration's policy leans toward the free trade idea and help through an adequate tariff seems remote.

The Alloy Steel Committee,

headed by A. Oram Fulton, Wheellock, Lovejoy & Co., Cambridge, Mass., was instructed to renew efforts to induce mills to quote cold-rolled alloy bars in lots of less than 1000 lb. each, on the basis of warehouse quotations. As matters now stand, mills use warehouse prices on hot-rolled alloy bars, but use mill base plus mill extras on cold-rolled products. This situation often results in mill quotations on cold-rolled steel, in lots of less than 1000 lb. each, being less than the prices asked for the same quality and quantity of hot-rolled steel.

The low margin of profit earned by warehouses was stressed by W. S. Doxsey, executive secretary of the association. His charts showed that 42 per cent of steel produced goes to 100 major consuming companies and that 58 per cent goes to the general market and that of this 58 per cent warehouses sell over 21 per cent. Thus distributors represent a large part of general industrial sales. He broke down customers to show 50,000 small manufacturers, 24,000 public utility and municipal plants, 23,000 power plants, 10,000 contractors and builders, 15,000 large steel consumers, 10,000 mines and quarries, and 60,000 non-metal industries that draw on warehouses for upkeep needs. In the United States warehouses handle 15 per cent of the steel sold, whereas in Germany they handle 50 per cent. Admitting that 50 per cent may be too high a mark in this country, nevertheless warehousemen believe 15 per cent to be too low.

New Chapter Directors

W. H. Scott, Syracuse Supply Co., Buffalo.
A. C. Castle, A. M. Castle & Co., Central States.
L. E. Denman, the R. C. Talbott Co., Cincinnati.
R. B. Shearer, the C. S. Mersick & Co., Connecticut.
L. S. Roehm, Jones & Laughlin Steel Corp., Detroit.
Raymond Lewis, Chas. C. Lewis Co., New England.
Walter Ganong, Edgar T. Ward's Sons Co., New York.
G. W. Boole, A. M. Castle & Co., Northern California.
R. D. Love, The Betz-Pierce Co., Northern Ohio.
L. B. Douglass, Scully Steel Products Co., Northwest.
A. B. Mead, Peter A. Frasse & Co., Philadelphia.
R. J. Stayman, Jones & Laughlin Steel Corp., Pittsburgh.
E. H. McGinnis, Union Hardware & Metal Co., Southern California.
G. K. Conant, Sligo Iron Store Co., St. Louis.
L. R. Moise, Moise Steel Co., Wisconsin.

Wagner and 30-Hr. Bills Opposed at Triple Mill Supply Convention

DECLARING that the Wagner labor relations bill would intensify differences between employers and employees and that the Black 30-hr. week would inflate prices too rapidly, the triple mill supply convention opposed both measures as developments which would delay permanent recovery. The convention meeting at the Carolinas Hotel, Pinehurst, N. C., May 14 to 16, favored a two-year extension of NRA under its present set-up and wired President Roosevelt to that effect. Resolutions covering these three points were unanimously approved by the Southern Supply and Machinery Distributors Associations, the National Supply and Machinery Distributors Association and the American Supply and Machinery Manufacturers Association, the three trade groups comprising the triple convention.

The three groups also decided to disband their existing joint merchandising committee and to organize in its place the Industrial Supply Research Bureau, Inc., with participation limited to members of the three sponsoring organizations. Protest was also recorded against the prevailing practice of allowing 15 per cent discounts beyond filed prices on all Government purchases.

The two distributor organizations again passed a resolution calling for a uniform cash discount of 2 per cent to eliminate the confusion existing now because of varied discounts offered by manufacturers. This same resolution was approved at the Cincinnati convention last year and is considered a matter of prime importance to the distributors.

Arthur D. Whiteside, president, Dun & Bradstreets, Inc., New York, and formerly an official of both NRA and NIRR, gave an intimate talk on the future of the Recovery Act and related Governmental activity. He stressed the importance of business men knowing what they wanted when seeking code clauses or other Federal assistance, conceded some of the weaknesses of NRA administration, but felt that these were due largely to a lack of common ground among industry groups themselves. He cited examples of cross purpose pleas from parts of the same industry group and sensed the gap between the desires and needs of small businesses and the larger businesses, saying that from the

latter group quite naturally came most of the advice given to Washington. NIRA is basically sound, he said, but too often mere theorists were allowed executive powers when their most useful services were of an advisory and research nature. This led to quibbling over phrases instead of getting at objectives, and caused confusion.

The speaker doubted the possibility of any permanent price fixing which, he said, had not been successfully followed elsewhere despite reports, but did tell of temporary price control which helped certain groups out of acute "red ink" conditions. Mr. Whiteside called for more active leadership in organized industry groups and said that industry was largely organized geographically instead of by groups. In closing he declared "the middleman" more necessary in today's economic picture than ever before in our commercial history.

W. P. Jeffery, executive secretary of the Hacksaw Manufacturers Association and a prominent New York attorney, talked on permissible cooperation between producers and distributors for the purpose of market stabilization. He urgently advocated open price filing as the best curb on vicious price cutting, declaring that open price filing forced price data out in the open where customers as well as competitors would know what was going on. It was his opinion that individual firms might exercise considerable resale price control within the law, but that collectively groups within an industry would undoubtedly be operating illegally in any such activity. He urged business men to distinguish between NIRA and the NRA administration work for a true picture of possible good from the recovery movement which, he said, had been handicapped by too many efforts at making mandatory conditions for other people to follow instead of educating business toward voluntary support for more economic practices.

Attendance was well over 600, with representations from distributor and producer groups about even.

F. M. Archer, Superior-Sterling Co., Bluefield, W. Va., was elected president of the Southern association, succeeding T. W. Lewis, Lewis Supply Co., Memphis, Tenn. G. G. Weak, Weak Supply Co., Monroe, La., and C. A. Dillon, Dil-

lon Supply Co., Raleigh, N. C., were chosen vice-presidents, and Alvin M. Smith, Smith-Courtney Co., Richmond, Va., was reelected secretary-treasurer.

John T. Potts, the Galigher Co., Salt Lake City, Utah, is the new president of the National association. He succeeds William T. Todd, Jr., Somers, Fitler & Todd Co., Pittsburgh, Pa. Vice-presidents are: Percy Ridings, Syracuse Supply Co., Syracuse, N. Y., and R. C. Duncan, R. C. Duncan Co., Minneapolis, Minn. George W. Eckhardt was chosen as full-time executive secretary and H. R. Rinehart will be secretary-treasurer. George A. Fernley, who has been secretary-treasurer, will continue in an advisory capacity. The last three have headquarters at 505 Arch Street, Philadelphia.

L. M. Knouse, Stanley Electrical Tool Co., New Britain, Conn., was elected president of the American association, succeeding J. Harvey Williams, J. H. Williams & Co., New York. Vice-presidents chosen are: George H. Halpin, Minnesota Mining & Mfg. Co., St. Paul, Minn., and Roger Tewksbury, Oster Mfg. Co., Cleveland. R. Kennedy Hanson, Pittsburgh, continues as secretary-manager, and W. H. Fisher, T. B. Woods Sons Co., Chambersburg, Pa., is treasurer.

Gray Iron Founders To Meet in June

THE Gray Iron Founders Society will meet at the Hotel Gibson, Cincinnati, June 6 and 7. The program will include addresses on costs, published prices, merchandising, silicosis, apprentice training, standard specifications, and the sale of castings per piece rather than per pound.

Franklin R. Hoadley, chairman of the code authority and president of the society, will discuss "The Value of an Organized and United Industry." Hyman Bornstein, Deere & Co., Moline, Ill., will present a paper on "Progress of Gray Iron Castings." "NRA as It Stands Today" will be the subject of a luncheon address by James W. Hook, president, Geometric Tool Co., New Haven, Conn., who is vice-chairman of the Durable Goods Committee and a member of the NRA Industrial Advisory Board. At the banquet on the evening of June 6, Prof. Olin Glenn Saxon, professor of business administration, Yale University, New Haven, will deliver an address on "The Philosophy of the New Deal."

Wagner Bill Ignores British Experience In Dealing with Coercion

By G. L. LACHER

Managing Editor, *The Iron Age*

THE Senate Committee on Education and Labor recommended the Wagner labor relations bill for passage on the grounds that it would equalize bargaining power between employers and employees and would promote industrial peace. Yet the committee refused to place any curb whatever on coercion as an instrument of national labor organizations. The bill prohibits employers alone from "interfering" with the right of employees to organize. The committee makes the comment that "regulation of the activities of employees and labor organizations in regard to the organization of employees is no more germane to the purposes of this bill than would be regulation of activities of employers and employer associations in connection with the organization of employers in trade associations."

This is sophistry to anyone who is not a blind partisan. The bill purports to guarantee workers the right to bargain collectively through representatives of "their own choosing." Freedom of choice implies freedom from coercion from any quarter. Is coercion no longer coercion if it comes from a national labor organization? Even the Senate Committee admits that organized labor is not free from racketeering. Shall the individual employee be left defenseless against strong-arm methods which are designed not only to intimidate him but to extort tribute?

This is no fanciful danger. Great Britain, which is frequently cited by New Dealers as having progressed much further than the United States in industrial relations, has found that union coercion of workers must be curbed. Following its general strike of 1926, involving 2,730,000 men, it enacted the Trades Disputes and Trades Unions Act of 1927, which specifically names and prohibits acts of coercion on the part of organized labor unions. In Section 3 the British law declares it unlawful for trade unions or their representatives to picket plants or homes in a manner calculated to intimidate workmen. So explicit is the act in its prohibitions on coercion that it even bans a one-man

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watch of a workman's home. This provision reads as follows:

Notwithstanding anything in any act, it shall not be lawful for one or more persons, for the purpose of inducing any person to work or to abstain from working, to watch or beset a house or place where a person resides or the approach to such a house or

place, and any person who acts in contravention of this subsection shall be liable on summary conviction to a fine not exceeding £20 or to imprisonment for a term not exceeding three months.

In this realistic manner the British, the outstanding realists of the world, have dealt with union coercion of employees. Are we to stick our heads ostrich-like into the sand because the Senate Committee declares that union coercion is not "germane" to the discussion?

PHILIP E. BLISS, president of the Warner & Swasey Co., and Charles J. Stilwell, vice-president, were awarded gold watches, in recognition of 25 years of service with the company, May 17, by Ambrose Swasey, chairman and co-founder of the company which has pioneered in the building of machine tools and astronomical instruments. Mr. Swasey expressed his gratitude for the "loyalty of the two boys who in a quarter of a century have kept their health and helped the rest of us to keep ours." Mr. Bliss, a former president of the National Machine Tool Builders Association and a former director of the National Industrial Conference Board, entered the company's employ June 5, 1910, as an accounting clerk. Appointed cashier in 1912, he occupied in rapid succession the posts of auditor and treasurer, and was elected a director in 1919. He became president in 1928.

Mr. Stilwell, now president of the National Machine Tool Builders Association entered the company's employ as a special apprentice July 1, 1910. After representing the company in New York and Europe he became assistant to the vice-president in 1916 and foreign sales manager shortly after the close of the World War. He was named sales manager in 1922 and vice-president seven years later.

Presentation of the watches by Mr. Swasey to the company's two ranking executive officers marked the sixty-first and sixty-second awards to employees in the company's service for 25 years.



Current Metal Working Activity Statistically Shown

These Data Are Assembled By THE IRON AGE From Recognized Sources And Are Changed Regularly As More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	April, 1935	March, 1935	April, 1934	Four Months, 1934	Four Months, 1935
Raw Materials:					
Lake ore consumption (gross tons) ^a	2,356,391	2,582,986	2,470,121	8,043,736	9,676,171
Coke production (net tons) ^b.....	.....	3,012,692	2,947,051	11,283,303	.....
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	1,663,475	1,770,028	1,726,851	5,825,284	6,519,391
Pig iron output—daily (gross tons) ^c	55,449	57,098	57,561	48,544	54,328
Castings:					
Malleable castings—production (net tons) ^d.....	.....	42,808	40,742	148,536	.....
Malleable castings—orders (net tons) ^d.....	.....	40,237	38,453	150,509	.....
Steel castings—production (net tons) ^d.....	.....	31,940	46,242	141,903	.....
Steel castings—orders (net tons) ^d.....	.....	30,723	63,142	185,182	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e ...	2,606,311	2,830,700	2,897,529	9,813,314	11,013,306
Steel ingot production—daily (gross tons) ^e ...	100,243	108,873	115,901	95,517	106,906
Steel ingot production—per cent of capacity ^e ..	45.28	49.18	52.64	44.54	48.30
Employment in Steel Industry:					
Total employees ^f.....	.....	425,189	431,086	411,668	.....
Total payrolls (thousands of dollars) ^f.....	.....	46,764	45,472	157,038	.....
Average hours worked per week ^f.....	.....	33.9	34.4	32.9	.....
Finished Steel:					
Trackwork shipments (net tons) ^g	4,399	3,440	6,132	16,699	13,064
Sheet steel sales (net tons) ^g.....	.....	193,057	272,412	824,474	.....
Sheet steel production (net tons) ^g.....	.....	227,082	214,522	793,256	.....
Fabricated shape orders (net tons) ^g.....	.....	99,327	121,552	393,977	.....
Fabricated shape shipments (net tons) ^g.....	.....	82,410	82,194	253,054	.....
Fabricated plate orders (net tons) ^g.....	.....	16,832	20,085	89,547	.....
Reinforcing bar awards (net tons) ^g	30,490	17,335	22,685	73,985	85,690
U. S. Steel Corp. shipments (tons) ^h	591,728	668,056	643,009	1,948,495	2,376,976
Ohio River steel shipments (net tons) ⁱ.....	.....	75,072	72,974	179,353	.....
Fabricated Products:					
Automobile production, U. S. and Canada ^k	*477,546	451,805	378,983	1,141,121	*1,591,381
Construction contracts, 37 Eastern States ^l.....	.....	\$123,043,500	.....	.....	.....
Steel barrel shipments (number) ^d.....	.....	658,216	2,471,549	.....	.....
Steel furniture shipments (dollars) ^d.....	.....	\$1,220,533	\$934,097	\$3,780,644	.....
Steel boiler orders (sq. ft.) ^d.....	.....	655,812	440,562	1,115,729	.....
Locomotive orders (number) ^m	2	8	40	63	11
Freight car orders (number) ^m	600	0	750	21,649	1,430
Machine tool index ^a	65.6	62.3	46.5	†48.5	†60.3
Foundry equipment index ^a	113.2	69.3	67.9	†67.7	†86.0
Foreign Trade:					
Total iron and steel imports (gross tons) ^p.....	.....	21,409	26,862	113,315	.....
Imports of pig iron (gross tons) ^p.....	.....	2,708	8,253	51,590	.....
Imports of all rolled steel (gross tons) ^p.....	.....	11,355	9,184	29,645	.....
Total iron and steel exports (gross tons) ^p.....	.....	323,035	201,539	792,015	.....
Exports of all rolled steel (gross tons) ^p.....	.....	78,483	71,882	314,442	.....
Exports of finished steel (gross tons) ^p.....	.....	68,146	68,785	296,179	.....
Exports of scrap (gross tons) ^p.....	.....	232,967	126,687	463,008	.....
British Production:					
British pig iron production (gross tons) ^r	526,300	553,200	496,300	1,855,600	2,083,800
British steel ingot production (gross tons) ^r	808,700	841,900	716,800	2,969,800	3,177,900
Non-Ferrous Metals:					
Lead production (net tons) ^s.....	.....	32,558	32,113	140,534	.....
Lead shipments (net tons) ^s.....	.....	28,960	30,673	120,683	.....
Zinc production (net tons) ^t	35,334	36,667	30,686	127,904	140,713
Zinc shipments (net tons) ^t	38,460	41,137	32,072	124,090	150,038
Deliveries of tin (gross tons) ^v	5,025	5,495	4,405	14,490	19,025

*Preliminary. †Three Months' Average.
 Sources of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^k When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^l F. W. Dodge Corp.; ^m Railway Age; ⁿ National Machine Tool Builders Association; ^o Foundry Equipment Manufacturers Association; ^p Department of Commerce; ^q British Iron and Steel Federation; ^r American Bureau of Metal Statistics; ^t American Zinc Institute, Inc.; ^v New York Commodities Exchange.

SUMMARY OF THIS WEEK'S BUSINESS

Steel Output Dips to 43 Per Cent As Scrap Shows Further Strength

**Farmer Buying Expands and Relief Work Is Being Expedited, But
Uncertainty as to Fate of Code Holds Back Demand**

STEEL output and scrap prices continue to exhibit conflicting tendencies, ingot production dropping from 44½ to 43 per cent of capacity and THE IRON AGE scrap index rising from \$10.67 to \$10.75 a gross ton. Prices of heavy melting steel are unchanged at Chicago and Philadelphia but have advanced 25c. a ton at Pittsburgh. Though the recent movement of scrap prices has been within narrow limits and may be accounted for in part by export demand and speculative activity, the continued accumulation of strength in virtually all markets is impressive. The composite scrap price has now registered its fourth consecutive weekly advance since touching \$10.33, its low to date this year.

Whatever the scrap market may portend for the later months of the year, the immediate outlook is for a further recession in iron and steel demand. Releases from General Motors units following the settlement of the Toledo strike have not been in sufficient volume to offset the decline in orders from the automobile industry as a whole. Most motor car makers, in anticipation of a seasonal recession as summer approaches, are reducing their inventories of parts and materials, and little fresh buying for present models is expected except to balance up existing stocks.

Refrigerator makers are also reducing their takings of steel as their season for heavy production draws to a close, but demand from washing machine builders is as yet undiminished. Tin plate output has risen to a full 85 per cent of capacity, though backlog are shrinking and the amount of stock being produced for later shipment is increasing.

THE sources of demand which give the best promise of early expansion are agriculture and Federal-financed construction. Tractor manufacturers are still pressed to keep abreast of sales, and farmer buying of both wire fencing and galvanized sheets has taken on new life. Precipitation throughout large areas that were drought-stricken a year ago has greatly improved crop prospects.

Works relief projects, as a result of pressure by the Administration, may get under way as early as June. Among the programs likely to be launched first is that covering highway construction and grade crossing elimination for which an allotment of \$500,000,000 has been recommended. Of this total, \$100,000,000 will

cover previously incurred obligations under the Hayden-Cartwright act of 1934, representing considerable material already on order.

AWARDS of constructional steel to date this year, including structural steel, plates, piling and reinforcing, total 430,105 tons as against 484,282 tons in the corresponding part of 1934.

The week's structural awards, at 13,800 tons, compare with 6700 tons in the previous week and 10,200 tons a fortnight ago. Lettings of sheet steel piling, totaling 6830 tons, include 5000 tons for a Mississippi River dam. Los Angeles has placed 5150 tons of cast iron pipe.

A New York subway has ordered 25 articulated five-section train units. The Wheeling & Lake Erie is in the market for 1000 to 2000 tons of rails, and the Pittsburgh & Lake Erie for 900 tons.

REAFFIRMATION of iron and steel prices for third quarter has removed one uncertainty, but another, of greater importance, is the fate of the steel code. Until the future of the NRA, and especially code price provisions, is settled, most iron and steel buyers will continue to limit purchases to current needs. Buying policy is in sharp contrast with what it was a year ago when there were heavy purchases in anticipation of price advances. This difference partly explains the gap between the present operating rate of 43 per cent and that of 58 per cent which prevailed in the corresponding week of 1934.

Rivet makers, who are not under a code, have also reaffirmed prices for the coming quarter. Milled cap screws have been reduced from 85 per cent discount to 85 and 10 per cent, following a decline in upset cap screws.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at \$17.83 a ton and 2.124c. a lb. respectively.

Ingot output is off 7½ points to 44½ per cent at Chicago, one point to 50 per cent in the Valleys, and five points to 72 per cent in the Wheeling district. At Buffalo the production rate has risen 11 points to 41 per cent, but elsewhere operations, though showing a sagging tendency, are substantially unchanged.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	May 21, 1935	May 14, 1935	Apr. 23, 1935	May 22, 1934
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia	\$20.3132	\$20.3132	\$20.26	\$20.26
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti.	19.13	19.13	19.13	19.13
No. 2, Birmingham†	14.50	14.50	14.50	14.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	18.50
Basic, del'd eastern Pa.	19.8132	19.8132	19.76	19.76
Basic, Valley furnace	18.00	18.00	18.00	18.00
Malleable, Chicago*	18.50	18.50	18.50	18.50
Malleable, Valley	18.50	18.50	18.50	18.50
L. S. charcoal, Chicago	24.2528	24.2528	24.2528	24.04
Ferromanganese, seab'd car-lots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

	May 21, 1935	May 14, 1935	Apr. 23, 1935	May 22, 1934
<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.65
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.75
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	3.25
Sheets, galv., No. 24, Gary...	3.20	3.20	3.20	3.35
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	2.00
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	2.10
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., Chicago dist. mill	3.00	3.00	3.00	3.00
Tin plate, 100 lb. box, P'gh.	\$5.25	\$5.25	\$5.25	\$5.25

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	29.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	30.00
Slabs, Pittsburgh	27.00	27.00	27.00	29.00
Forging billets, Pittsburgh	32.00	32.00	32.00	34.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00
Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.70

Finished Steel

<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.90
Bars, Chicago	1.85	1.85	1.85	1.95
Bars, Cleveland	1.85	1.85	1.85	1.95
Bars, New York	2.15	2.15	2.15	2.23
Plates, Pittsburgh	1.80	1.80	1.80	1.85
Plates, Chicago	1.85	1.85	1.85	1.90
Plates, New York	2.09	2.09	2.0926	2.13
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.85
Structural shapes, Chicago	1.85	1.85	1.85	1.90
Structural shapes, New York	2.06 1/4	2.06 1/4	2.063175	2.10 1/4
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	2.00
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.80

Off export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. †Blue Eagle copper.

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh...	\$11.75	\$11.50	\$11.50	\$12.25
Heavy melting steel, Phila.	10.50	10.50	9.75	10.50
Heavy melting steel, Ch'go	10.00	10.00	9.75	10.75
Carwheels, Chicago	10.50	10.50	10.50	10.75
Carwheels, Philadelphia	11.25	11.25	11.25	12.50
No. 1 cast, Pittsburgh	12.75	12.75	12.25	12.75
No. 1 cast, Philadelphia	11.25	11.25	11.00	12.25
No. 1 cast, Ch'go (net ton)...	9.00	9.00	9.00	8.50
No. 1 RR. wrot., Phila...	10.25	10.25	10.75	12.25
No. 1 RR. wrot., Ch'go (net)	8.00	8.00	8.00	8.50

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt	....	\$3.85	\$3.85	\$3.85
Foundry coke, prompt	....	4.60	4.60	4.60

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	8.25
Lake copper, New York‡	9.12 1/2	9.12 1/2	9.12 1/2	8.62 1/2
Tin (Straits), New York	51.35	50.75	50.62 1/2	53.40
Zinc, East St. Louis	4.25	4.20	4.10	4.35
Zinc, New York	4.62 1/2	4.57 1/2	4.45	4.70
Lead, St. Louis	3.95	3.65	3.60	3.85
Lead, New York	4.10	3.80	3.75	4.00
Antimony (Asiatic), N. Y.	14.25	14.25	14.25	8.37 1/2

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1935	2.124c, Jan. 8	2.124c, Jan. 8	\$17.90, Jan. 8	\$17.83, May 14	\$12.33, Jan. 8	\$10.33, April 23
1934	2.199c, April 24	2.008c, Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c, Oct. 3	1.867c, April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c, Oct. 4	1.926c, Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c, Jan. 13	1.945c, Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c, Jan. 7	2.018c, Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c, April 2	2.273c, Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c, Dec. 11	2.217c, July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	12.08, July 2
1927	2.402c, Jan. 4	2.212c, Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Production Holds at 36 Per Cent at Pittsburgh



Valley Rate Is Off One Point to 50 Per Cent and Wheeling Average Drops to 72 Per Cent—Steel Scrap Advances

PITTSBURGH, May 21.—Filing of finished steel prices for third quarter today will result in a general reestablishment of current quotations. Although consumer demand appears to be slackening, the extension of present quotations for next quarter delivery may dispel some of the uncertainty that had veiled prices prior to the current filing. Caution among consumers, however, probably will not disappear entirely until the fate of the steel code, and particularly its price provisions, is settled.

New buying in the current week is slow as a result of the steel meeting and other conventions at New York. Settlement of the automotive strikes has not stimulated heavier specifications.

In the Pittsburgh area the forward outlook for heavy hot-rolled steel is becoming brighter with the approaching expenditures for Federal relief works. Highway construction and highway-railroad grade separation and protection in Pennsylvania assure a fair demand for constructional steel in the early summer months.

The first project of the Allegheny County Authority will be a tolls plaza for the Liberty Tubes at Pittsburgh, requiring 300 to 500 tons, for which plans are expected to be issued soon. Other projects in the program are maturing slowly. The Pittsburgh & Lake Erie Railroad is contemplating the purchase of approximately 900 tons of rails and a small tonnage of track fastenings.

Although ingot output of the leading producer is tending downward this week, moderately higher schedules at one or two independent plants and unchanged schedules in other directions are sustaining operations for the Pittsburgh district at 36 per cent. Raw steel production in the Valleys and nearby northern Ohio mills is off one point to 50 per cent, while in the Wheeling district production is down five points to 72 per cent.

The Pittsburgh scrap market is stronger, with heavy melting steel 25c. a ton higher at \$11.50 to \$12.

Pig Iron

Current quotations of \$18 for basic and \$19 for Bessemer, Sharpsville and Neville Island, will be reaffirmed for third quarter delivery. The malleable and No. 2 foundry price of \$18.50 also will be extended. Small foundry orders are not appearing so frequently, and Bessemer and basic continue to move in small volume to detached steel mills. Only a small part of mill equipment makers' pig iron demand is finding its way into the open market in the face of reciprocal arrangements. Melt at ingot mold plants is tapering.

Semi-Finished Steel

Rerolling billets, blooms and slabs are expected to be reaffirmed for third quarter on the present base of \$27, and forging quality at \$32 a gross ton, Pittsburgh. Sheet bars will be reestablished at \$28 a gross ton; skelp at 1.70c. a lb.; tube rounds at 1.80c. base per lb., and common wire rods at \$38 a gross ton. Some non-integrated tin plate mills have fair stocks of sheet bars, which are moving slower in anticipation of an early decline in tin plate output. Billets and slabs are in steady demand, while calls for skelp are not so frequent.

Rails and Track Accessories

Second quarter quotations on rails and track spikes have been extended through third quarter. The local rail mill will reduce its rolling schedule considerably this week, a larger part of the recent Erie Railroad order having been completed.

Bolts, Nuts and Rivets

Announcement of third quarter discounts may be made late this week. The persistence of price irregularities in some districts may have some bearing on discounts for the coming quarter, but leading producers favor extension of the current setup. May business is

not up to the April record, and it is considered unlikely that general reduction in prices would stimulate increased buying. Railroad grade crossing elimination planned in the public works program is expected to create a fairly substantial demand for bolts and nuts.

Reinforcing Steel

Orders are appearing in steady, though small, volume. No marked improvement in demand is in sight for another month or two, when some business unquestionably will be placed for Pennsylvania highway construction and highway-railroad grade separation and protection work under the Federal Relief Works Program. For highway construction, Pennsylvania has been allotted \$9,350,000, and for highway-railroad grade separation and protection the State has been allotted \$11,483,000. With no prospective change contemplated in the Pittsburgh hot-rolled bar base, it appears likely that the present Pittsburgh price of 2.05c. for billet steel reinforcing in straight lengths as quoted by distributors will be reaffirmed for third quarter.

Cold Finished Bars

The movement of non-integrated cold-finished bar producers to regain part of the \$3 a ton reduction in the base price early in second quarter thus far has not been availing, and it appears likely that no change in the present Pittsburgh base of 1.95c. a lb. will be made for third quarter shipment. The lifting of labor stress in the automotive industry evidently has not affected incoming volume, which is not any heavier than it was during the height of the recent strikes. Some parts makers and motor car manufacturers appear to be rather heavily stocked, and despite the still ambitious plans for heavy assemblies in June some cold-finishingers are not counting on much improvement next month in automotive buying. General business is steady. Farm implement makers and jobbers, however, are not buying heavily.

Plates and Shapes

Structural plates and shapes are practically certain to be reaffirmed for third quarter at the present Pittsburgh base of 1.80c. a lb. A large tonnage of plates pends for barge construction, but no sizable contracts have been let in this district during the past week. The outlook for increased demand from the railroads is obscure, and important favorable developments

now depend largely upon what proportion of public works money is used for projects requiring plates and shapes.

The structural market here offers little immediate encouragement. The lists of awards and inquiries for the past week were small, with a minimum of private works items.

Tubular Products

Producers in this district expect to file current pipe and tubing discounts for reestablishment for third quarter. Recommendations for slight revisions in extras covering pressure tubes have not yet been acted upon. The revision, in effect, would slightly reduce prices on pressure tubes in quantities less than 1000 lb. Although bookings are in sustained volume, present indications point to a slight tonnage loss for May as compared with April business. The bulk of current orders is for oil country goods. The Federal relief expenditures are expected to create a substantial demand for tubular products late in third quarter. Current pipe mill operations are holding at around 40 per cent.

Bars

Orders in the past week have provided a comfortable lead for May tonnage over April business. Heavier specifications from the automotive industry have helped production in this district, while miscellaneous tonnage continues at an unusually steady pace. The present Pittsburgh base price of 1.80c. a lb. will be filled for reestablishment next quarter by leading producers here.

Wire Products

Pittsburgh base quotations on all wire products will be reaffirmed for third quarter delivery. No changes in extras are being contemplated. The settlement of the automotive strikes has not thus far stimulated increased specifications for manufacturers' wire. Demand from other directions, however, is in good volume, and mill schedules have not suffered any marked setback. Current production in this district is estimated at 35 per cent.

Sheets

All present Pittsburgh base quotations for sheets will be extended to third quarter shipments. Specifications from practically all consuming groups in the past week were in unchanged volume, and sheet mill schedules this week will continue at 55 to 60 per cent. Settlement of automotive strikes seems to have brought little change in

the character of specifications from the motor car industry.

Tin Plate

Output in the current week is scheduled at a full 85 per cent, but backlogs fall far short of assuring a long run at that rate. Stocks of tin plate being produced for later shipment are increasing, while specifications for spot shipment are not in great evidence.

Strip Steel

Hot-rolled strip will be reaffirmed for third quarter at 1.85c., and cold-rolled strips at 2.60c. base per lb., Pittsburgh. Shipping releases placed by Chevrolet after settlement of the recent strikes have stimulated heavier production. In the current week, output will rise moderately to between 45 and 50 per cent. Cold-rolled production is around 45 per cent. Little change can be detected in the trend of miscellaneous demand or of the demand from the farm implement industry and jobbers.

Coke and Coal

A genuine improvement in current consumption of bituminous coal is accounting partly for heavier shipments. There are some minor indications of additional stocking by industrial plants in anticipation of labor difficulties in June. However, the large railroads are reported to have huge supplies of coal on hand, while the public utilities also are comfortably stocked. Lake movement is gaining momentum slowly. The Struthers Iron & Steel Co., Struthers, Ohio, has covered in this district for its requirements of by-product coke, amounting to 12,000 to 15,000 tons a month, which will be produced at a leading independent steel maker's plant. The foundry coke market is featureless.

Scrap

Continued strong dealer bidding and small consumer purchases have sustained strength in this market. No. 1 heavy melting steel is 25c. a ton higher at \$11.50 to \$12. A sizable mill purchase of scrap rails at \$13.50 represents an advance of \$1.50 over the prevailing market for that grade. This sharp advance is due primarily to the relative scarcity of good scrap rails. Prices bid against railroad lists are a further indication of strength, with \$12.75, Wheeling, reported paid for No. 1 heavy melting steel on the last Baltimore & Ohio Railroad list. Scrap rails on the Pennsylvania Railroad list this month are reported to have brought \$13.44, delivered this district. Specialties have moved 25c.

a ton higher. Buying in the Youngstown district is becoming more active. A leading mill there has purchased a fairly sizable tonnage of several grades of scrap, including No. 1 heavy melting steel at \$12, and No. 2 at \$11.25. delivered.

Output Rises At Buffalo

BUFFALO, May 21.—Open-hearth activity has increased one unit with Republic Steel Corp. operating five furnaces instead of four. Bethlehem's Lackawanna plant continues to operate nine, and Wickwire-Spencer Steel Corp., one. The Seneca sheet division of Bethlehem is operating at 75 per cent of capacity.

Fabricated steel business has picked up somewhat. The Austin Co. of Cleveland is low bidder on the general contract for an addition to the plant of the American Radiator Corp., requiring 200 tons of steel.

Pig iron business thus far is not as good as during April, but the volume is steady.

Conditions seem to be shaping for a scrap shortage and dealers are confident of a stronger market. With heavy exportation of scrap, most available supplies east of Syracuse are going into export. The combination of customs duty and demand from Canadian mills is keeping Canadian scrap out and Pittsburgh and Youngstown operators are beginning to interest themselves in the Buffalo market. Dealers' stocks are fairly well liquidated and they feel that scrap today is a better buy than a sale. An indication of strength is the fact that the principal consumer has raised its price 50c. to \$10.50 without getting any appreciable amount of material.

Scrap Prices Higher At Detroit

DETROIT, May 21.—Local dealers have been bidding up scrap, although consumers have no inclination to pay higher prices. Hydraulic bundles have advanced 25c. a ton and now are 50c. above heavy melting steel. This situation is accounted for by the fact that the Detroit district steel plant is temporarily out of the market for melting steel but still is taking in bundles. Several items have gone up 25c. to 50c.

Chicago Rate Off $7\frac{1}{2}$ To $44\frac{1}{2}$ Per Cent



Most of the Drop Is in Sheet Demand
But Structural Releases Are Fair and
Farm Outlook Is Improved

CHICAGO, May 21.—Ingot output has dropped $7\frac{1}{2}$ points to $44\frac{1}{2}$ per cent of capacity. The largest part of this drop is traceable to the sheet trade and in particular to the automobile industry. However, there is some prospect that specifications pent up during recent labor strife will reach mills before the end of the week, with the result that part of this week's loss may be regained in the very near future. At the moment labor troubles appear to be less acute, though the situation is still not without its dangers.

Structural steel releases remain in fair volume and rail mills are spreading schedules so that they will hold until early in July. Both bar sales and specifications remain close to recent levels. Wire fencing is taking on new life and at an out-of-season period. Galvanized sheets are moving to farm areas in large quantities and this will ultimately benefit mills that have already furnished this product to roofing distributors. In many parts of the West which last year were drought-stricken there is a feeling that good crops are assured for this year. In some Northwestern areas crops now growing will be the first in five years.

The impression remains that iron and steel prices will for the most part remain unchanged for the third quarter. The local scrap market remains strong on the basis of dealer and broker trades.

Pig Iron

This market is swinging along at a steady gait, though there are indications of a letdown in automobile production. The matter of prices is being watched very closely by consumers, who rather generally expect current quotations to be carried forward to third quarter with very little variation.

Reinforcing Bars

Outstanding in this week's business is the award of 3300 tons for the filter plant at Milwaukee. Although a few large jobs are in prospect the bulk of requests for prices consists of small undertak-

ings. On this score shops foresee lower operations. Opinion leans strongly to the viewpoint that the recession will not be marked and that it may be of short duration. Government spending should increase as the summer advances, and private work, though still small in the aggregate, gives active signs of spreading.

Cast Iron Pipe

This market is quiet except for an award of 1500 tons by Milwaukee and another of 300 tons by Jackson, Mich. Fresh inquiries are lagging, principally for the reason that the percentage of free grants of Federal funds to municipalities has not been determined. Consideration is being given to altering the former allowance which was 30 per cent. The trade believes that once this point is determined much tonnage will come out for figures.

Rails

New orders consist only of scattered lots of track supplies totaling not more than 1000 tons. Pending rail tonnages are very slow in reaching the order stage and railroads that are deferring inquiries are still silent as to their plans. In the meantime local rail mills are producing at 20 to 25 per cent of capacity and are spreading tonnages so that the current rate can be held until early in July. The light rail market is quiet, though it may take on some life if several large coal producers broaden their scale of operations, as they now plan to do.

Structural Material

Awards total more than 11,000 tons and fresh inquiries have expanded to over 15,000 tons. The American Bridge Co. has taken 8300 tons, including castings and machinery, for the Mississippi River dam at Alton, Ill. The St. Charles, Mo., bridge for the Wabash, which calls for 8500 tons of steel, is the largest new structural project. A medical center at New Orleans will take 1900 tons. The progress that has been made in improving the Illinois, Mississippi and Missouri rivers is

indicated by the fact that the Federal line plans to start weekly barge service between Chicago and Kansas City.

Plates

Mills are still starved for real tonnage and there is nothing in sight to give relief. Miscellaneous orders, all in small lots, total less than 1500 tons. A fair part of the steel that is to go into the Alton, Ill., Dam will come from plate mills. If Western railroads are planning to order new equipment they are keeping preliminary plans very quiet.

Sheets

Most of the drop in steel mill operations must be laid on the doorstep of the larger sheet consumers, and in the main the automobile builders. However, there is a brighter side to the situation and that is that the needs dammed up by recent strikes are about to be released. Hence there is a strong possibility that sheet mills will be busier before the week is out. Larger quantities of galvanized sheets are moving into country areas.

Wire Products

Business is more variable than heretofore, but the total volume is surprisingly good. Aggregate of orders for May compares favorably with the first 20 days of April. The unexpected tonnages include liberal quantities of welding wire and also woven wire fencing from the farm areas. Some sellers hold the opinion that the approach of the third quarter contracting period and the delay in announcing fall fence terms are preventing the market from attaining the activity that it might otherwise have reached at this time.

Bars

Several strikes have been terminated at plants that supply parts to farm implement machinery builders. Releases are now reaching mills from automobile parts manufacturing centers where strikes had cut off production. On the other hand, some automobile builders, anticipating labor trouble, had made parts well ahead of retail sales of cars.

Scrap

Forces are still pulling both ways against the price structure. Lower mill operations and the release of about 30,000 tons by a producer to the north of Chicago are unfavorable to higher prices. On the other hand, brokers do not hesitate to pay \$10.50 a gross ton delivered for heavy melting steel, and some of the specialty grades are bringing higher prices.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.11c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel

	(For merchant trade)	Base per Lb.
F.o.b. Pittsburgh		1.70c.
F.o.b. Chicago		1.75c.
F.o.b. Gary		1.75c.
F.o.b. Moline, Ill.		1.75c.
F.o.b. Cleveland		1.80c.
F.o.b. Buffalo		1.80c.
F.o.b. Birmingham		1.85c.
F.o.b. cars dock Gulf ports		2.10c.
F.o.b. cars dock Pacific ports		2.25c.

Bullet Steel Reinforcing

	(Straight lengths as quoted by distributors)	Base per Lb.
F.o.b. Pittsburgh		2.05c.
F.o.b. Chicago		2.10c.
F.o.b. Gary		2.10c.
Del'd Detroit		2.20c.
F.o.b. Cleveland		2.10c.
F.o.b. Youngstown		2.10c.
F.o.b. Buffalo		2.10c.
F.o.b. Birmingham		2.10c.
F.o.b. cars dock Gulf ports		2.45c.
F.o.b. cars dock Pacific ports		2.45c.

Rail Steel Reinforcing

	(Straight lengths as quoted by distributors)	Base per Lb.
F.o.b. Pittsburgh		1.90c.
F.o.b. Chicago		1.95c.
F.o.b. Gary		1.95c.
Del'd Detroit		2.20c.
F.o.b. Cleveland		1.95c.
F.o.b. Youngstown		1.95c.
F.o.b. Buffalo		1.95c.
F.o.b. Birmingham		1.95c.
F.o.b. cars dock Gulf ports		2.30c.
F.o.b. cars dock Pacific ports		2.30c.

Iron

	Base per Lb.
F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago	2.00c.
F.o.b. Gary	2.00c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Detroit	2.15c.
Del'd eastern Michigan	2.20c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

	Base per Net Ton
F.o.b. Pittsburgh	\$50.00
F.o.b. Chicago	50.00
F.o.b. Gary	50.00
F.o.b. Cleveland	51.00
F.o.b. Birmingham	50.00
F.o.b. Houston, Orange, Beaumont, Galveston	53.00
F.o.b. Mobile	59.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	58.00
F.o.b. parts dock Pacific ports	59.00
	63.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.90c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd New York	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

	Base per Lb.
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

	Sheets	Hot Rolled	Base per Lb.
No. 10, f.o.b. Pittsburgh			1.85c.
No. 10, f.o.b. Gary			1.95c.
No. 10, del'd Detroit			2.05c.
No. 10, del'd Phila.			2.16c.
No. 10, f.o.b. Birmingham			2.00c.
No. 10, f.o.b. dock cars Pacific ports			2.40c.

Hot-Rolled Annealed

	Hot-Rolled Annealed	Base per Lb.
No. 24, f.o.b. Pittsburgh		2.40c.
No. 24, f.o.b. Gary		2.50c.
No. 24, del'd Detroit		2.60c.
No. 24, del'd Phila.		2.71c.
No. 24, f.o.b. Birmingham		2.53c.
No. 24, f.o.b. dock cars Pacific ports		3.05c.
No. 24, wrought iron, Pittsburgh		4.30c.

Heavy Cold-Rolled

	Heavy Cold-Rolled	Base per Lb.
No. 10 gage, f.o.b. Pittsburgh		2.50c.
No. 10 gage, f.o.b. Gary		2.60c.
No. 10 gage, del'd Detroit		2.70c.
No. 10 gage, del'd Phila.		2.81c.
No. 10 gage, f.o.b. Birmingham		2.65c.
No. 10 gage, f.o.b. dock cars Pacific ports		3.10c.

Light Cold-Rolled

	Light Cold-Rolled	Base per Lb.
No. 20 gage, f.o.b. Pittsburgh		2.95c.
No. 20 gage, f.o.b. Gary		3.05c.
No. 20 gage, del'd Detroit		3.15c.
No. 20 gage, del'd Phila.		3.26c.
No. 20 gage, f.o.b. Birmingham		3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports		3.50c.

Galvanized Sheets

	Galvanized Sheets	Base per Lb.
No. 24, gage, f.o.b. Pittsburgh		3.10c.
No. 24, f.o.b. Gary		3.20c.
No. 24, del'd Phila.		3.41c.
No. 24, f.o.b. dock cars Pacific ports		3.25c.
No. 24, wrought iron, Pittsburgh		4.95c.

Long Ternes

	Long Ternes	Base per Lb.
No. 24, unassorted 8-lb. coating		3.40c.
F.o.b. Pittsburgh		3.40c.
F.o.b. cars dock Pacific ports		4.10c.

Vitreous Enameling Stock

	Vitreous Enameling Stock	Base per Lb.
No. 20, f.o.b. Pittsburgh		3.10c.

Tin Mill Black Plate

	Tin Mill Black Plate	Base per Lb.
No. 28, f.o.b. Pittsburgh		2.75c.
No. 28, Gary		2.85c.
No. 28, cars dock, Pacific Coast ports		3.35c.
No. 28, f.o.b. Birmingham		2.75c.

Tin Plate

	Tin Plate	Base per Lb.
(P.o.b. Pittsburgh)		
(Per Package, 20 x 28 in.)		
8-lb. coating I.C.		\$10.00
15-lb. coating I.C.		12.00
20-lb. coating I.C.		13.00
25-lb. coating I.C.		14.00
30-lb. coating I.C.		15.25
40-lb. coating I.C.		17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 In.

	Base per Lb.
All widths up to 24 in., P'gh.	1.85c.
All widths up to 24 in., Chicago.	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in	

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts	70, 10 and 5
Carriage bolts	70, 10 and 5
Lod bolts	70, 10 and 5
Flow bolts, Nos. 1, 2, 3 and 7	70, 10 and 5
heads	70, 10 and 5
Hot-pressed nuts, blank or tapped, square	70, 10 and 5
Hot-pressed nuts, blank or tapped, hexagons	70, 10 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70, 10 and 5
semi-finished hexagon nuts, U.S.A. all sizes	70, 10 and 5
semi-finished hexagon nuts, S.A.E. $\frac{1}{4}$ in. to 7/16 in. diameter	70, 10 and 5
$\frac{1}{2}$ in. to 1 in. diameter	70, 10 and 5
larger than 1 in. diameter	70, 10 and 5
Store bolts in packages, Pittsburgh	75
Store bolts in packages, Chicago	75
Store bolts in packages, Cleveland	75
Store bolts in bulk, Pittsburgh	83
Store bolts in bulk, Chicago	83
Store bolts in bulk, Cleveland	83
Tire bolts	60 and 5

Large Rivets

($\frac{1}{2}$ -in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05
Small Rivets	
(7/16-in. and smaller)	

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago	75
F.o.b. Birmingham and Birm'g'm.	70 and 5
Cap and Set Screws	

(Freight allowed up to but not exceeding 5¢ per 100 lb. on lots of 200 lb. or more)

Per Cent Off List	
Milled cap screws, 1 in. dia. and smaller	85 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread, $\frac{1}{4}$ in. and smaller	75
Upset hex. head cap screws, U.S.S.A. or S.A.E. thread, 1 in. dia. and smaller	87 $\frac{1}{2}$
Upset set screw, cut and oval point	80
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Uncroped \$40 per gross ton

Alloy Steel Blooms, Billets and Slabs	
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.	
Base price, \$49 a gross ton.	
Price del'd. Detroit is \$52.	
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	
Open-hearth grade, base	2.45c.
Delivered price at Detroit is	2.60c.
S.A.E. Alloy	
Series Differential	
Numbers per 100 lb.	
2000 (1/2 Nickel)	\$0.25
2100 (2 1/2% Nickel)	0.55
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
4100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is $\frac{1}{2}$ c. per lb. higher with some extra. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and $\frac{1}{2}$ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extra.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

Per Lb.

Forging billets	19.55c.
Revolving slabs	15c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20.5c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncroped \$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncroped \$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Per Gross Ton

Rerolling	\$27.00
Forging quality	32.00

Delivered Detroit

Rerolling	\$30.00
Forging	35.00

Billets Only F.o.b. Duluth

Rerolling	\$29.00
Forging	34.00

Open-hearth or Bessemer

Per Gross Ton	
Open-hearth or Bessemer	\$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh	\$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

CANADA

Pig Iron

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.25.....	20.50
Malleable	21.00

FERROALLOYS

Ferrromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	Per Gross Ton
Domestic, 80% (carload)	\$85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$26.00
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Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$22.75
7%	23.75
8%	24.75
9%	25.75
10%	26.75
11%	27.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher at Jackson.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10%	\$27.75
11%	28.75
12%	30.25
13%	31.75

Manganese 1 $\frac{1}{2}$ to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 ton additional.

Base prices at Buffalo are \$1.25 a ton higher at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del. carloads

Ferrotungsten, less carloads

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads

Ferrochromium, 2% carbon

Ferrochromium, 1% carbon

Ferrochromium, 0.10% carbon

Ferrochromium, 0.06% carbon

Ferrovandium, del. per lb. contained V. \$2.70 to \$2.90

Ferrocobaltitanium, 15 to 18% Ti. 6 to 8% C. f.o.b. furnace carload and contract per net ton. \$137.50

Ferronphosphorus, electric, or blast furnace material, in carloads. 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage 50.00

Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage 55.00

Ferromolybdenum, per lb. Mo. del. 95.00

Calcium molybdate, per lb. Mo. del. 80c.

Silico spiegel, per ton, f.o.b. furnace, car lots

Ton lots or less per ton

15.50

Silico-manganese, gross ton, delivered:

2.50% carbon grade

2% carbon grade

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	\$11.50 to	\$12.00
No. 2 heavy melting steel	10.00 to	10.50
No. 2 railroad wrought	11.50 to	12.00
Scrap rails	13.00 to	13.50
Halls, 3 ft. and under	13.50 to	14.00
Compressed sheet steel	11.25 to	11.75
Hand bundled sheet steel	10.00 to	10.50
Hvy. steel axle turnings	10.00 to	10.50
Machine shop turnings	8.00 to	8.50
Short shov. turnings	8.00 to	8.50
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
Cast iron carwheels	12.00 to	12.50
Heavy breakable cast	11.50 to	12.00
No. 1 cast	12.50 to	13.00
Ballr. knuckles and couplers	14.25 to	14.75
Rail, coil and leaf springs	14.25 to	14.75
Rolled steel wheels	14.25 to	14.75
Low phos. billet crops	15.00 to	15.50
Low phos. sheet bar crops	14.25 to	14.75
Low phos. plate scrap	14.00 to	14.50
Low phos. punchings	14.00 to	14.50
Steel car axles	14.25 to	14.75

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton		
Heavy melting steel	\$9.75 to	\$10.25
Automobile hvy. melt. steel	9.00 to	9.50
Shoveling steel	8.75 to	10.25
Hydraulic comp. sheets	9.00 to	10.50
Drop forge flashings	7.50 to	8.00
No. 1 busheling	8.25 to	8.75
Rolled carwheels	11.00 to	11.50
Ballroad leaf springs	10.50 to	11.00
Axle turnings	9.00 to	9.50
Steel couplers and knuckles	11.00 to	11.50
Coll springs	12.00 to	12.50
Axle turnings (elec. fur.)	9.50 to	10.00
Low phos. punchings	13.00 to	13.50
Low phos. plates, 12 in. and under	13.00 to	13.50
Cast iron borings	5.00 to	5.50
Short shoveling turnings	5.50 to	6.00
Machine shop turnings	5.00 to	5.50
Rerolling rails	11.00 to	11.50
Steel rails, less than 3 ft.	12.00 to	12.50
Steel rails, less than 2 ft.	13.00 to	13.50
Angle bars, steel	12.50 to	13.00
Cast iron carwheels	10.50 to	11.00
Railroad malleable	13.00 to	13.50
Agricultural malleable	9.50 to	10.00

Per Net Ton		
Iron car axles	\$14.50 to	\$15.00
Steel car axles	13.00 to	13.50
No. 1 railroad wrought	8.00 to	8.50
No. 2 railroad wrought	8.50 to	9.00
No. 2 busheling	4.50 to	5.00
Locomotive tires, smooth	10.00 to	10.50
Pipe and flues	5.00 to	5.50
No. 1 machinery cast	9.00 to	9.50
Clean automobile cast	8.50 to	9.00
No. 1 railroad cast	8.00 to	8.50
No. 1 agricultural cast	8.00 to	8.50
Stove plate	6.00 to	6.50
Grate bars	5.50 to	6.00
Brake shoes	6.00 to	6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	\$9.50 to	\$10.50
No. 2 heavy melting steel	8.50 to	9.50
No. 1 railroad wrought	10.00 to	10.50
Bundled sheets	9.50 to	10.00
Hydraulic compressed, new	9.50 to	10.00
Hydraulic compressed, old	7.00 to	7.50
Machine shop turnings	5.50 to	6.00
Heavy axle turnings	8.50 to	9.00
Cast borings	5.00 to	5.50
Stove plate (steel works)	8.00 to	8.25
Heavy breakable cast	10.50 to	11.00
Couplers and knuckles	13.50 to	14.00
Rolled steel wheels	13.50 to	14.00
No. 1 blast furnace	4.75 to	5.00
Spec. iron and steel pipe	8.00 to	8.50
Shafting	17.00 to	17.50
Steel axles	16.00 to	16.50
No. 1 forge fire	9.50 to	10.00
Cast iron carwheels	11.00 to	11.50
No. 1 cast	11.00 to	11.50
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	12.00 to	12.50

* Brokers' buying price for export.

CINCINNATI

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	\$7.50 to	\$8.00
No. 2 heavy melting steel	6.00 to	6.50
Scrap rails for melting	7.50 to	8.00
Loose sheet clippings	4.00 to	4.50
Bundled sheets	5.50 to	6.00
Cast iron borings	4.00 to	4.50
Machine shop turnings	4.00 to	4.50
No. 1 busheling	5.50 to	6.00
Rails for rolling	2.25 to	2.75
Short rails	8.50 to	9.00
No. 1 locomotive tires	6.75 to	7.25
Cast iron carwheels	7.50 to	8.00
No. 1 machinery cast	8.75 to	9.25
No. 1 railroad cast	8.00 to	8.50
Burnt cast	5.50 to	6.00
Stove plate	5.50 to	6.00
Agricultural malleable	7.50 to	8.00
Railroad malleable	8.50 to	9.00

CLEVELAND

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	\$9.75 to	\$10.25
No. 2 heavy melting steel	9.25 to	9.75
Compressed sheet steel	9.25 to	9.75
Light bundled sheet stampings	7.00 to	7.50
Drop forge flashings	8.00 to	8.50
Machine shop turnings	5.00 to	5.50
Short shoveling turnings	6.00 to	6.50
No. 1 busheling	8.50 to	9.00
Steel axle turnings	8.50 to	9.00
Low phos. billet crops	14.00 to	14.50
Cast iron borings	6.00 to	6.50
Mixed borings and short turnings	6.00 to	6.50
No. 2 busheling	6.00 to	6.50
No. 1 cast	11.50 to	12.00
Ballr. knuckles and couplers	14.25 to	14.75
Rail, coil and leaf springs	14.25 to	14.75
Rolled steel wheels	14.25 to	14.75
Low phos. billet crops	15.00 to	15.50
Low phos. sheet bar crops	14.25 to	14.75
Low phos. plate scrap	14.00 to	14.50
Low phos. punchings	14.00 to	14.50
Steel car axles	14.25 to	14.75

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

Per gross ton, f.o.b. Buffalo consumers' plants:		
No. 1 heavy melting steel	\$10.00	
No. 2 heavy melting scrap	\$8.50 to	9.00
Scrap rails	11.00	
New hydraulic comp. sheets	8.50 to	9.00
Old hydraulic comp. sheets	7.50 to	8.00
Drop forge flashings	8.00 to	9.00
No. 1 busheling	8.50 to	9.00
Heavy steel axle turnings	8.00 to	8.50
Machine shop turnings	5.00 to	5.50
Knuckles and couplers	11.50 to	12.00
Coll and leaf springs	11.50 to	12.00
Roller steel wheels	11.50 to	12.00
Low phos. billet crops	12.00 to	12.50
Short shov. steel turnings	6.00 to	6.50
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
Mixed borings and short turnings	6.00 to	6.50
No. 2 busheling	6.00 to	6.50
No. 1 cast	11.50 to	12.00
Railroad grate bars	7.00 to	7.50
Stage plate	7.25 to	7.75
Rails under 3 ft.	14.00 to	14.50
Railroad malleable	13.00 to	13.50
Cast iron carwheels	10.75 to	11.00

BOSTON

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	\$8.50 to	\$8.50
No. 1 heavy melting steel	\$5.65 to	6.00
Scrap rails	8.50 to	8.75
Scrap T rails	8.50 to	8.75
Scrap rails	6.40 to	6.65
No. 2 steel	7.50	
No. 2 steel	4.75 to	5.00
Breakable cast	5.00 to	5.25
Machine shop turnings	2.00 to	2.25
Machine shop turnings	1.25 to	1.50
Cast iron borings	6.00 to	6.50
Stove plate	6.25 to	6.50
No. 1 railroad wrought	7.00 to	7.50
No. 1 railroad wrought	6.00 to	6.50
Forge fire	4.75 to	5.00
Shafting	11.75 to	12.00
Steel car axles	11.50 to	12.00
Cast iron borings, chemical	6.50 to	7.00
Cast iron borings	6.25 to	6.50
Cast iron borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	4.00 to	4.50

Per gross ton delivered consumers' yards:

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	\$9.00 to	\$9.50
Scrap steel rails	10.00 to	10.50
Short shoveling turnings	7.00	
Steel axles	11.50	
Iron axles	11.50	
No. 1 railroad wrought	7.00	
Rails for rolling	12.50	
No. 1 cast	9.50 to	10.00
Tramcar wheels	10.00	
* For direct car loading only.		
† Loading on barge.		

BIRMINGHAM

Per gross ton delivered consumers' yards:		
Heavy melting steel	\$9.00 to	\$9.50
Scrap steel rails	10.00 to	10.50
Short shoveling turnings	7.00	
Stove plates	7.00	
Steel axles	11.50	
Iron axles	11.50	
No. 1 railroad wrought	7.00	
Rails for rolling	12.50	
No. 1 cast	9.50 to	10.00
Tramcar wheels	10.00	

ST. LOUIS

Per gross ton delivered consumers' yards:

Per gross ton delivered consumers' yards:		
Selected heavy steel	\$8.50 to	\$9.00
No. 1 heavy melting	8.25 to	8.75
No. 2 heavy melting	7.25 to	7.75
No. 1 locomotive tires	9.75 to	10.25
Misc. standee tires	9.50 to	10.00
Railroad springs	10.50 to	11.00
Bundled sheets	8.00 to	8.50
No. 2 railroad wrought	8.25 to	8.75
No. 1 busheling	5.50 to	6.00
Cast iron borings and shoveling turnings	3.00 to	3.50
Rails for rolling	10.00 to	10.50
Machine shop turnings	2.75 to	3.25
Heavy turnings	5.50 to	6.00
Steel car axles	12.50 to	13.00
Iron car axles	15.00 to	16.00
No. 1 railroad wrought	6.00 to	6.50
Steel rails less than 3 ft.	11.50 to	12.00
Steel angle bars	9.50 to	

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	2.20c.
Squares and flats	2.20c.
Hoops and bands under 1/4 in.	2.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Hot-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheet (No. 10)	3.31c.
Hot-rolled ann'ld sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24)	4.50c.
Long term sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x 1/2 in. and larger	3.65c.
Open hearth spring steel, 4.00c. to 10.00c.	
Common wire nails, base per kg.	\$.321
Nuts, all styles, 100 count, 65 per cent off list.	Per Cent
Large rivets, base per 100 lb.	\$.350
Wire, black, soft ann'ld, base per 100 lb.	2.70
Wire, galv. soft, base per 100 lb.	2.925
Common wire nails, per kg.	2.834
Cement coated nails, per kg.	2.834

On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.85c.
Flats and squares	3.35c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Splikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
Machine bolts	2.70
Carriage bolts	2.70
Lag screws	2.70
Hot-pressed nuts, sq. tap. or	
Hot-pressed nuts, sq. tap or blank	2.70
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	2.70
Hex. head cap screws	3.00
Cut point set screws	2.70 and 10
Flat head bright wood screws	37 1/2 and 10
Sewing cottons	3.50
Screw bolts in full packages	2.70
Md. hd. tank rivets 7/16 in. and	
smaller	57 1/2
Wrought wirehairs	4.50 per lb. off list
Black ann'ld wire per 100 lb.	\$.385
Common wire nails, base per kg.	2.95c
Cement c'td nails, base per kg.	2.95c

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies to orders of 400 to 999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.26c.
Iron bars	3.26c.
Iron bars, swed. charred	6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	4.31c.
Hot-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheet (No. 10)	3.31c.
Hot-rolled ann'ld sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24)	4.50c.
Long term sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x 1/2 in. and larger	3.65c.
Open hearth spring steel, 4.00c. to 10.00c.	
Common wire nails, base per kg.	\$.321
Nuts, all styles, 100 count, 65 per cent off list.	Per Cent
Large rivets, base per 100 lb.	\$.350
Wire, black, soft ann'ld, base per 100 lb.	2.70
Wire, galv. soft, base per 100 lb.	2.925
Common wire nails, per kg.	2.834
Cement coated nails, per kg.	2.834

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.64c.
Hot-rolled sheets (No. 10)	3.29c.
*Galv. corrug. sheets	4.64c.
Structural rivets	3.99c.
Boiler rivets	4.09c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machining and carriage bolts, lag screws	
fittings up bolts, bolt ends, plow bolts,	
hot-pressed nuts, square and hexagon,	
tapped or blank, semi-finished nuts:	
All quantities	70

*No. 28 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars (small shapes, iron bars (except hands))	2.93c.
*Reinforce, steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.61c.
Steel hoops	3.43c.
Steel bands, No. 12 and 3/16 in.	3.18c.
Spring steel	3.65c.
*Hot-rolled annealed sheets (No. 24)	3.65c.
*Galvanized sheets (No. 24)	4.30c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.25c.

*These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	7.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Lead coated sheets (No. 10)	3.11c.

Cold-finished flats	3.75c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.42c.
Bars, soft steel or iron	3.17c.
New billet reinforce. bars	3.25c.
Hall steel reinforce. bars	3.25c.
Hoops and bands, 3/16 in. and	
lighter	3.47c.
Cold-finished bars	3.57c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'ld wire, per 100 lb. (1000 lb. or over)	\$.288
Common wire nails, base per kg.	
Any quantity less than carload	3.04
Cement c'td nails, base 100-lb. keg	\$.35
Chain, 1-in., per 100 lb.	\$.35
Net per 100 Ft.	
Seamless steel boiler tubes, 2-in.	\$21.67
4-in.	51.19
Lap-welded steel boiler tubes, 2-in.	20.62
4-in.	48.19

†Outside delivery 10c. less.

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars	2.95c.
Hot-rolled strip	3.41c.
Hot-rolled annealed sheets (No. 10)	3.16c.
Galvanized sheets (No. 24)	4.66c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.30c.
Structural rivets (keg lots)	3.86c.
Boiler rivets (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.10c.
Common wire nails	2.90c.
Cement coated nails	2.90c.

Per Cent Off List

Machine bolts

Carriage bolts

Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)

or blank

or blank (keg lots)

Lead Prices Advanced \$6 a Ton to 3.95c. a lb. During Past Week

Zinc Also Moves Up Five Points and Tin Is Raised Slightly
On Sterling Advance—Copper Market Remains Quiet

NEW YORK, May 21.—Despite continued strength and activity in the foreign market, the domestic situation remains rather quiet. Sales here yesterday amounted to only 368 tons, but the May total to date of 17,000 tons is not far behind the corresponding April figure. The publication of April statistics should have given the market a stronger tone, as United States refined copper stocks declined about 17,000 tons, as against a slight increase for the entire world. The Blue Eagle price

remains unchanged at 9c. a lb., Connecticut Valley, and the recent uncertainty over the fate of the NRA has made a few consumers cautious. The market abroad continues strong, and, although it has eased off a little from last week's high, electrolytic copper was quoted this morning at 8.15c. to 8.20c. a lb., usual Continental base ports.

Tin

The tin market continues very dull. Buyers are showing scarcely

any interest in futures and demand for spot metal is by no means good. While tin plate operations are well maintained and will probably continue at a high level through June, steel companies are making few forward commitments. Prices in New York have advanced slightly in the last week largely because of the increase in sterling. Straits metal was quoted here today at 51.35c. a lb., compared with 50.75c. one week ago. At London this morning standard spot metal was available at £228 10s. and futures at £221 15s. Straits was quoted at £239 10s., and the market in the East was £230 15s.

Lead

An advance of 15 points in lead quotations this morning, the fifth increase since last Monday, brought quotations to 3.95c. a lb., St. Louis, and 4.10c., New York, the highest levels in more than a year. The leading interest continues to ask a premium of \$1 a ton on sales in the East, and completed transactions at 4.15c. this morning. Last week's increases were all confined to \$1 a ton, as was the mark up yesterday. The 15-point rise this morning, however, was not unexpected, as demand has been very heavy and the statistical position of the industry is considerably improved. The London parity today was 5.22c. and the market here could move up substantially before imports might become dangerous. The strike in the ore fields has taken 3000 tons of lead out of the market monthly. Finally, the expected 50 per cent increase in shipments during April, as compared with April, 1934, is a very bullish factor. April statistics will be published this week.

Zinc

Zinc quotations were marked up another five points last week and now stand at 4.25c., East St. Louis, and 4.62½c., New York. Demand continues rather heavy and sales last week amounted to about 9000 tons, compared with 8100 tons in the previous period. The ore strike seems to have become rather generally effective, as last week's production of concentrates was only 250 tons. Shipments were 200 tons. The prices of \$25 a ton for the flotation grade and \$26 for mill material are entirely nominal.

Ingot Brass and Bronze

Combined shipments of ingot brass and bronze during March as reported to the code authority of the ingot brass and bronze industry amounted to 5014 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	May 15	May 16	May 17	May 18	May 20	May 21
Electrolytic copper, N. Y. *	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, spot, New York . . .	50.80	51.25	51.62½	51.37½	51.35	
Zinc, East St. Louis	4.20	4.25	4.25	4.25	4.25	4.25
Zinc, New York†	4.57½	4.62½	4.62½	4.62½	4.62½	4.62½
Lead, St. Louis	3.70	3.75	3.75	3.75	3.80	3.95
Lead, New York	3.85	3.90	3.90	3.90	3.95	4.10

*Refinery quotations; price ½c. higher delivered in Connecticut.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for
week.

Nickel, electrolytic, 35c. to 36c. a lb. based at refinery in lots of 2 tons or more.
Antimony, 14.25c. a lb., New York.
Brass Ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.
Tin, Straits pig 52.50c. to 53.50c.
Tin, bar 54.50c. to 55.50c.
Copper, Lake 10.25c. to 11.00c.
Copper, electrolytic 10.00c. to 10.50c.
Copper, castings 9.75c. to 10.75c.
*Copper sheets, hot- rolled 16.00c.
*High brass sheets 14.25c.
*Seamless brass tubes 16.00c.
*Seamless copper tubes 16.25c.
*Brass rods 12.75c.
Zinc, slabs 5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over 10.25c.
Lead, American pig 4.62½c. to 5.62½c.
Lead, bar 5.62½c. to 6.62½c.
Lead, sheets 7.75c.
Antimony, Asiatic 15.50c. to 16.50c.
Alum., virgin, 99 per cent, plus 23.30c.
Alum., No. 1 for re- melting, 98 to 99 per cent 18.00c. to 19.00c.
Solder, ½ and 1½ 30.00c. to 31.00c.
Babbitt metal, com- mercial grades 25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.
Tin, Straits pig 55.50c.
Tin, bar 57.50c.

Copper, Lake 10.00c.

Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slabs	5.50c. to 5.75c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	8.00c.
Antimony, Asiatic	15.75c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	59.50c.
Solder, ½ and 1½	32.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy, crucible	6.00c. 6.75c.
Copper, hvy, and wire	5.87½c. 6.37½c.
Copper, light and bottoms	4.87½c. 5.37½c.
Brass, heavy	3.25c. 3.87½c.
Brass, light	2.50c. 3.25c.
Hvy, machine com- position	4.75c. 5.25c.
No. 1 yel. brass turnings	4.25c. 4.75c.
No. 1 red brass or compos. turnings	4.50c. 5.00c.
Lead, heavy	2.75c. 3.12½c.
Zinc	2.12½c. 2.50c.
Cast aluminum	10.12½c. 11.25c.
Sheet aluminum	11.50c. 13.00c.

Construction is Bigger Factor in New York



Tin Plate and Stainless Steel Also Are Sustaining Influences As General Line Consumers Postpone Purchases

NEW YORK, May 21.—Steel demand is uneven, with some sellers reporting a gain in orders and others a decline. Tin plate releases are heavier and construction activity is on the increase. Bookings of stainless steel are showing an uninterrupted growth with little or no relation to seasonal influences. Thus far business has been mainly from the food and drink processing industries rather than from the building industry.

Uncertainty as to the future of the code is causing many consumers to postpone buying, and it is probable that this factor will be even more in evidence in coming weeks.

The Harlem River crossing of the Triborough bridge, New York, 7500 tons, has been awarded to the Taylor-Fichter Steel Construction Co., and it is reported that the plain material will be furnished by the Jones & Laughlin Steel Corp. Contracts for this bridge placed to date account for a total of 56,700 tons, and approximately 10,000 tons remains to be let. Federal Construction Co. is low bidder on the fabrication of 1100 tons of structural steel for a high school at New Dorp, Staten Island, N. Y. Work in early prospect includes 5000 tons for the Hendrik Hudson bridge over Spuyten Duyvil, New York, 12,000 tons for the West Side elevated highway between Forty-ninth and Fifty-ninth Streets, New York, and 5000 tons for the New York City highway between Seventy-seventh and Eighty-first Streets, New York. In addition to the steel for the Manhattan approach to the Thirty-eighth Street tunnel mentioned a week ago, a large quantity of bolts and nuts will be required.

The passage of the works relief bill has had the effect of releasing considerable steel against public jobs which had been placed subject to the subsequent provision of funds. Fully \$100,000,000 worth of such work, representing the unappropriated balance of the projects authorized under the Hayden-Cartwright act, will now go ahead, it is reported. In addition, calls for

bids as early as next month are expected on some of the new highway and grade separation projects authorized under the latest relief appropriation act. New expenditures authorized for this State are \$11,046,377 for highways, roads and streets and \$13,577,189 for highway-railroad grade separation and protection. The corresponding figures for New Jersey are \$3,129,805 and \$3,983,826 respectively, and for Connecticut, \$1,418,709 and \$1,712,684.

The Standard Oil Co. of New Jersey is in the market for 1200 tons, mainly plates, for an oil refinery on the island of Aruba in the West Indies.

Pig Iron

Total bookings for the past seven-day period amounted to about 1400 tons, as compared with 1150 tons a week ago and 1350 sold a fortnight ago. Current business is still far under what is considered the normal market volume, but some sellers consider the urgent character of most of the day-to-day business as an indication that there is a considerable amount of ordering pending. This demand will only make itself felt as soon as some indication is forthcoming as to what disposition will be made of the steel code's open price filing provision. Second quarter prices have been reaffirmed for third quarter delivery.

Reinforcing Steel

Small-lot demands continue in fair volume. However there are only a few projects now active which call for more than 100 tons. Taylor-Fichter Steel Construction Co. is expected to soon award 1800 tons of bars for the Harlem River crossing of the Triborough Bridge, New York. New York has purchased 150 tons of wire mesh from American Steel & Wire Co. No new projects of any size have come up for bidding during the past week.

Scrap

Although the domestic market continues almost inactive, leading brokers look for no price reaction of any consequence during the sum-

mer months. Despite this strong outlook, foreign buyers continue to withhold new commitments in the belief that lower prices may be offered during the next few months. As in previous weeks, brokers are currently paying at least \$8.50 and \$7, respectively, for No. 1 and No. 2 steels for coverage on outstanding contracts. These contracts are being shipped out as fast as boats can be secured. Although bottoms for Yawata, Japan, are somewhat more plentiful, brokers who have sold c.i.f. are now finding it necessary to pay over \$4 a ton for delivery to that port whereas charter rates were in the neighborhood of \$3.50 several months ago when most of the tonnage was sold.

Operations Off In South

BIRMINGHAM, May 21.—Steel production in the Birmingham district dropped off as the week opened and a material change was noted for the first time since Feb. 12. The Gulf States Steel Co. took out of production one of the three open-hearth furnaces which have been in operation, and the schedule for this week, and for some time to come, calls for operation of two open-hearth furnaces by this company.

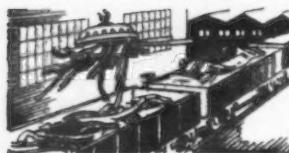
The Tennessee Coal, Iron & Railroad Co. is continuing the operation of nine open-hearth furnaces. Five of these are on production of steel for rails, and will continue for two or three weeks, when the present railroad bookings will be completed, and a further and more drastic drop in production in the district is expected to follow.

The Tennessee company has five blast furnaces in operation, with one of them on recarbonization iron and the others on mill iron. The merchant producers of pig iron have five furnaces in operation.

The demand for soil pipe has shown a tendency to increase, and another foundry in the Anniston section has reopened with full code time operation. Prospects for a further increase in soil pipe business are encouraging. Structural steel fabricators are bidding on a larger tonnage than for several months. Should this business materialize for the district, it would take up considerable of the slack that will be left with completion of railroad orders the latter part of May or the first week in June.

Cast iron pressure pipe orders continue to develop in sufficient quantity to maintain the production average of the district.

Demand Shows Downward Tendency at Cleveland



Automobile and Refrigerator Manufacturers Take Steel on a Diminishing Scale—Ingot Output Holds at 43 Per Cent

CLEVELAND, May 21.—Finished steel orders placed during the week showed a slightly downward tendency in the demand. Automobile manufacturers continue to make commitments, but in smaller lots, indicating that some of the plants are merely rounding out their stocks for present models with a view of discontinuing these and starting on new models in August.

The local Fisher Body plant has released considerable tonnage of sheets and strip steel that was held up because of the Chevrolet strike.

New business in sheets from refrigerator manufacturers has declined as the season of heavy production is drawing to a close. Some of the refrigerator makers have shipped out the large stocks they built up early in the season and are now making shipments directly from their production lines.

Miscellaneous demand is well maintained and business with mills making the heavier rolled steel products is holding closely to the April volume.

The Wheeling & Lake Erie Railroad has placed an additional 500 tons of sheet steel piling for its Huron, Ohio, breakwater, dividing the business between three producers. A rail purchase of 1000 to 2000 tons is expected by this road shortly.

Ingot output in the Cleveland-Lorain territory is unchanged this week at 43 per cent of capacity.

Lake furnaces have extended present pig iron prices for the third quarter, and prices on most steel products are expected to be reaffirmed for that delivery. However, no forward buying is looked for until Washington decides whether the NRA and steel code are to be extended. Rivet manufacturers, who do not operate under a code, have reaffirmed present prices.

With advances in steel-making scrap and a decline in blast furnace grades, scrap prices show conflicting tendencies.

using Lake ore, an increase of one for the month.

Sheets

Northern Ohio mills have benefited by the settlement of the Chevrolet strike, as all shipments to the local Fisher Body plant which were held up during the strike have been released. New business is coming from the automotive industry but in considerably smaller lots than recently, as some of the motor car manufacturers are getting ready to finish production on their current models and are buying only to round out their stocks. Refrigerator manufacturers are drawing near the end of their season of heavy production and demand from that source has dwindled. Orders from makers of washing machine tubs are holding up well. Following its recent strike, the Newton Steel Co. has not resumed operations of its Monroe, Mich., plant, although it has started shipments.

Strip Steel

Producers are still feeling the effects of the Chevrolet strike. While the local Fisher Body plant is taking shipments at the same rate as before the strike, some of the larger automobile parts makers have issued releases for only part of the tonnage that was held up when their operations were interfered with by the strike. New demand is rather light.

Bolts, Nuts and Rivets

Rivet prices have been reaffirmed for the third quarter. Some bolt and nut makers are anxious to advance prices for that delivery, claiming that increased costs prevent them from making a profit at present regular quotations and these are being shaded in some sections. Milled cap screws have been reduced from 85 per cent discount to 85 and 10 per cent. This change follows a recent decline on upset cap screws. Reestablished rivet prices are \$2.90 per 100 lb., Pittsburgh and Cleveland, for large rivets, and 70 and 10 per cent discount for small rivets.

Bars, Plates and Shapes

Structural inquiry, mostly for public work, is slightly more active. New inquiries are out for work in connection with the Muskingum Conservancy District project, requiring 530 tons of structural shapes and reinforcing bars. Cleveland has asked for bids for an administration building, taking 420 tons of shapes and bars. A Cleveland contractor is low bidder on grade crossing elimination work in Buffalo, taking 350 tons of bars and piling, and a Pennsylvania

Railroad grade crossing elimination job in Fort Wayne, Ind., will take 350 tons of structural shapes. Demand for merchant bars is less active than recently. Plates are quiet.

Scrap

Steel-making grades are firm and prices have advanced in the Valley district. A Youngstown mill has purchased a round tonnage of heavy melting steel, paying \$12 for No. 1, or 50c. higher than it paid for a small lot a few days ago, and \$11.25 for No. 2. Blast furnace scrap, on the other hand, has declined locally 25c. a ton. Cleveland mills are getting all the blast furnace scrap they need by water from Detroit. Hence there is no local demand.

Large Tonnages Placed On Coast

SAN FRANCISCO, May 20.—The booking of 2800 tons of structural steel by Ingalls Iron Works Co., for the San Francisco-Oakland bridge distribution structure featured the past week's activity. The 3033 tons of reinforcing bars and 330 tons of pipe railing required on the project are yet to be placed.

Five Eastern mills will furnish the 1327 tons of steel sheet piling to be used in the Cherry Creek retarding dam near Denver, Colo. Colorado Fuel & Iron Co. took 450 tons of reinforcing bars for the dam. Golden Gate Iron Works is reported to have booked 225 tons of structural steel for the Montgomery Ward & Co. building at Sacramento, Cal. The third quarter requirements of 5150 tons of cast iron pipe for the Los Angeles Department of Water and Power will be filled by United States Pipe & Foundry Co., American Cast Iron Pipe Co. and National Cast Iron Pipe Co.

Progress on the contemplated White Point outfall sewer near Los Angeles is seen in the call for bids on July 2 on the tunnel work. This unit will require 2450 tons of reinforcing bars, 750 tons of structural steel and 120 ft. of 60-in. cast iron pipe. It is believed that a call for bids will be issued within two weeks for the total cast iron pipe requirements of 5630 ft. of 60-in.

At Fort Peck, Mont., bids are being opened May 31 on 9400 tons of steel sheet piling to be used in a retaining wall. Pacific Coast Steel Corp. is reported to be low bidder for furnishing 475 tons of shapes for use on the Eagle Creek bridge which is included in the Bonneville dam project.



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Business volume on the Coast continues favorable as a result of work on Federal, State and municipal programs. Industrial demand for steel continues to be spasmodic. Loadings of scrap for export are slightly above average.

Boston Export Scrap Market Active

BOSTON, May 21.—Prices for scrap for Pennsylvania delivery are firmer, but 90 per cent nominal. Offers for turnings at \$2 a ton, f.o.b., and for scrap rails at \$12.75, delivered, are better than heretofore. Export demand remains strong, with prices very firm and suitable supplies diminishing. Recent sales include turnings at \$4.50 a ton, delivered army base here, engine blocks and stove plate at \$6.25 to \$6.50, mostly 6.50, scrap rails at \$8.50 with some small tonnages \$8.75, and No. 1 and No. 2 steel at former prices. Last Friday a boat from New York, partly loaded, took 1500 tons of No. 1 steel, stove plate and blocks at Providence, R. I., for Scotland. Another boat is scheduled to start loading there May 24. A boat is loading 7200 tons at army base, presumably for Italy. Japan is confining scrap purchase to railroad accessories and tin. Local April exports approximated 25,000 tons.

Pig iron sales are few, small and far between. Jobbing foundry melt is up one week and down the next, with net results on the downside. Machine tool manufacturing foundries are the brightest spots.

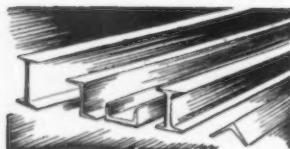
Strikes Still Disturb Cincinnati Mart

CINCINNATI, May 21.—Pig iron bookings, all in small lots, totaled less than 700 tons. The steadiness of spot business, however, indicates that consumption is equal to demand, with the market sensitive to any increase in foundry operations. Strikes in this area are retarding output among automotive foundries, while melters serving the farm equipment industry report an easing in their operations. Better melt is noted among machine tool foundries.

Continuance of labor trouble in the automotive industry has further curtailed demand for finished sheets, with the district index dipping to about 60 per cent of mill capacity. There has been a small improvement in export business, but a slackening in electric refrigerator demand has offset the increase of foreign demand. Backlogs are nil and rolling schedules, this week, will be about 65 per cent of mill capacity.

Scrap dealers are placing small speculative orders, apparently to test the market and be in position for anticipated mill demand. Users, however, continue to press for lower prices, keeping current quotations nominal. Expiration of some old contracts is reflected in smaller movement of scrap on contract.

Business Volume Decreases Further in Philadelphia



Although Prices Are Reaffirmed, Consumers Wait for NRA Developments —Scrap Market Continues Very Firm

PHILADELPHIA, May 21.—The reaffirming of all prices for third quarter delivery has had no effect on consumer buying in this area. In fact, general business volume during the past seven-day period has been even below preceding weeks. Buyers are limiting their orders to their most urgent needs as a reflection of the uncertainty over the future of the NRA and the steel code.

All mills in this area are operating at about the same rate as in the last week, and the district rate is unchanged at 32 per cent of capacity. A slight betterment in the demand for blue-annealed material has forced two mills to continue melting in two open-hearths. Both plants are stocking some ingots and, unless demands improve considerably in the near future, it is quite possible that they will both take off a furnace. The poor market for structural shapes is also reflected in the light operations at Pencoyd, at which point three fur-

naces are melting and a small structural mill is operating one turn daily.

The 4200 employees of the New York Shipbuilding Co. continue on strike with the result that steel shipments to that point are at a standstill. Seven Navy vessels and one Standard Oil tanker are under construction.

Pig Iron

Most sellers have received a few small orders for quick delivery, but aggregate booking for the entire week were even smaller than those of previous weeks. Although second quarter prices have been reaffirmed for third quarter delivery, most buyers are awaiting some assurance that the NRA will be prolonged to protect these price levels. If the NRA is continued, it is quite possible that some good tonnages may come out in the near future. First quarter deliveries in this district were considerably above those made in the corre-

sponding quarter a year ago. Second quarter deliveries will probably fall far under the heavy shipments made in the second quarter of 1934.

Sheets and Strip

Users of full-finished sheets continue to restrict purchases to minimum immediate requirements. Forward commitments have practically disappeared as a reflection of the uncertain status of the NRA. Fabricators of storage tanks are operating on heavier schedules and local mills have experienced a pick-up in demands for blue-annealed sheets 60 in. or more in width. Standard blue-annealed sheets continue in poor demand. With the exception of several mixed carloads of strip recently sold to radio makers, this type of steel is very quiet.

Bars, Plates and Shapes

Merchant bars and reinforcing bars are both extremely quiet. The market for plates is still characterized by small-lot orders for immediate shipment, with an entire absence of orders aggregating 100 tons or more. The Erie Railroad is directing the specifying of certain materials for its ferryboat being built by Sun Shipbuilding Co., and there is a considerable tonnage of plates yet to be purchased for this boat. No action has been taken on the two oil tankers for Gulf Refining Co. It is quite possible that Sun Shipbuilding Co. will secure this contract, but it is very improbable that any material will be purchased from mills until the fate of the NRA is settled and some definite assurance is forthcoming as to stability of third quarter prices.

Imports

The following iron and steel imports were received here last week: 5000 tons of chrome ore from Portuguese Africa and 483 tons of the same product from British South Africa; 303 tons of pig iron from Russia; 70 tons of steel bands, 48 tons of steel bars, 46 tons of structural shapes and 7 tons of diamond plates from Belgium, and 53 tons of steel tubes, 22 tons of steel wire, 22 tons of steel bars, 13 tons of steel forgings, 11 tons of charcoal bar iron and 1 ton of steel billets from Sweden.

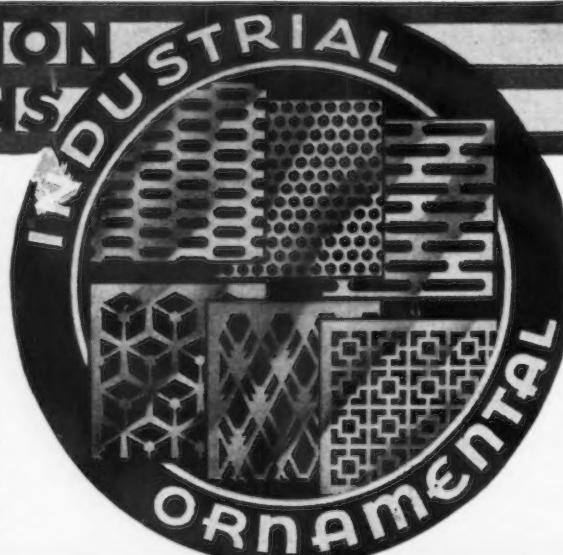
Scrap

Coatesville has not yet opened up on No. 1 steel deliveries, but that point continues to take deliveries on turnings, stove plate and heavy cast. Likewise, brokers are still paying \$7.50 for stove plate at Phoenixville and \$8.75 for No. 2 at Ivy Rock. The domestic market has been exceptionally quiet dur-

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ing the week. Brokers continue to buy heavily for foreign shipment in an effort to reduce forward bookings. Charter rates on Japanese bottoms have advanced over 50c. a ton during the last few months, thereby obliterating a good portion of the profit on c.i.f. contracts.

Wagner Bill Approved By House Committee

WASHINGTON, May 21.—Expecting to take it up in the House next week and rush it to early passage, the House Committee on labor today approved the Wagner-Connery labor disputes bill. The President has not yet indicated whether he will sign the measure. Even if he does not, proponents of the bill say it would easily pass over his veto. They say, however, that the President will sign it.

The only difference between the Wagner and the Connery bills is that the former sets up the National Labor Relations Board as an independent body, while the Connery bill would place it in the Department of Labor.

Mackintosh-Hemphill Sets Up Finishing Division

THE Mackintosh-Hemphill Co., Pittsburgh, has established a finishing machinery division under the direction of Frank H. Streine, who formerly was vice-president



FRANK H. STREINE

and general manager of the Streine Tool & Mfg. Co., and more recently general manager of the Mill Equipment Co. Mr. Streine origi-



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nally was engaged in the machine tool business in Cincinnati. He entered the business of building steel finishing machinery in 1914 and was one of the organizers of the Streine company in 1917. He actively directed that company until last year.

The company's new division is a natural complement to Mackintosh-Hemphill's present facilities for the designing and building of mills and mill machinery, and the casting of rolls. It will build all types of auxiliary equipment for shearing, slitting, flattening, form-

ing, corrugating and handling sheets, strip, tin plate, steel plates and slabs.

Among its products will be rotary side trip shears, rotary gang slitters, squaring shears, double-end cut shears, up-cut shears, roller levelers, stretcher levelers, un-coilers and re-coilers, tables, oiling rolls and forming presses.

The finishing machinery work of the Mackintosh-Hemphill business will be carried on at the company's plants at Pittsburgh, Midland, Pa., and Wooster, Ohio.

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New Orleans, 200 tons, Louisiana State College dental building.

New Orleans, 1900 tons, medical center.

CENTRAL STATES

Chicago, 300 tons, Armour & Co. packing house; Jacobson Brothers, low bidders on general contract.

Ecrose, Mich., 825 tons, cranes.

Zanesville, Ohio, 200 tons, relocation transmission towers, Muskingum District Conservation project; bids to be taken by United States Engineers, Zanesville, June 14.

Zanesville, 110 tons, structural steel and reinforcing bars, relocating Pennsylvania Railroad tracks at Brinkhaven, Ohio; bids to be taken by United States Engineers, Zanesville, June 4.

Zanesville, 120 tons, relocation Wheeling & Lake Erie tracks at Beach City reservoir; bids to be taken by United States Engineers, Zanesville, about June 26.

Cincinnati, 500 tons, store building for F. W. Woolworth Co.

Cleveland, 150 tons, administration building for Easterly sewage disposal plant; bids May 31.

WESTERN STATES

Denver, 700 tons, custom house addition.

San Francisco, 100 tons, Girls' High School; new bids May 29.

Stockton, Cal., 184 to 240 tons, County bridge over Honker Cut; bids June 3.

Los Angeles, 750 tons, White Point outfall sewer; bids July 2.

Bonneville, Ore., 475 tons, material for Eagle Creek bridge on Bonneville project; Pacific Coast Steel Corp., low bidder.

FABRICATED PLATE

AWARDS

Vicksburg, 312 tons, pontoon pipe for United States Engineers, to Treadwell Construction Co.

Eureka, Cal., 1300 tons, Mad River pipe line, to American Concrete & Steel Pipe Co.

Walla Walla, Wash., 100 tons, tank at State prison, to Pittsburgh-Des Moines Steel Co.

Camarillo, Cal., 200 tons, two tanks at State hospital, to an unnamed bidder.

NEW PROJECTS

Island of Aruba, West Indies, 1200 tons, refinery for Standard Oil Co. of New Jersey.

South Pasadena, Cal., 100 tons, city tank, Chicago Bridge & Iron Works, low bidder.

Seattle, 150 tons, Ballard trunk sewer, alternate on wood; bids soon.

Mammoth, Yellowstone National Park, Wyo., 350 tons, pipe line at power plant for National Park Service; bids May 24.

Los Angeles, 1850 tons, material for San Gabriel dam; revised plans rejected.

Coulee, Wash., 325 tons, hoppers.

SHEET PILING

AWARDS

Huron, Ohio, 500 tons for Wheeling & Lake Erie dock work, 300 tons to Carnegie Steel Co., and 100 tons each to Bethlehem Steel Co. and Jones & Laughlin Steel Corp.

Alton, Ill., 5000 tons, Dam No. 26 in Mississippi River, to Illinois Steel Co.

Denver, 1330 tons, Cherry Creek retarding dam, divided among Bethlehem Steel Co., Carnegie Steel Co., Illinois Steel Co., Inland Steel Co. and Jones & Laughlin Steel Corp.

NEW PROJECTS

Buffalo, 100 tons, William Street grade elimination for Erie Railroad; Freeman-Jones, Inc., Cleveland, low bidder for general contract.

Fabricated Structural Steel

Lettings Higher—New Projects Decline

MORE than one-half of the week's structural steel awards, totaling 13,800 tons, is accounted for by two lettings—7500 tons for the Harlem River crossing for the Tri-Borough bridge in New York and 2800 tons for the Trans-Bay bridge distribution structure at San Francisco. New projects of 6700 tons compare with 18,125 tons last week and 6000 tons two weeks ago. The largest new job reported is 1900 tons for a medical center at New Orleans. Plate lettings call for 1912 tons, with 2125 tons pending. Sheet piling awards of 6830 tons include 5000 tons for Dam No. 26 in the Mississippi River at Alton, Ill. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Northampton, Mass., 300 tons, college unit, to Haarmann Steel Co.

New York, 110 tons, Mott Haven Health Center, to Berkshire Structural Steel Co.

New York, 500 tons, Pennsylvania Railroad mail conveyors, to Lamson Co., Inc.

New York, 7500 tons, Harlem River crossing of Tri-Borough bridge, to Taylor-Fichter Steel Construction Co.

New York, 260 tons, Post Office Station W, to Lehigh Structural Steel Co.

Philadelphia, 100 tons, storage building for E. F. Houghton Co., to McClintic-Marshall Corp.

Niagara Falls, N. Y., 150 tons, addition to Carborundum Co. plant, to McClintic-Marshall Steel Corp.

Buffalo, 200 tons, building for American Radiator & Standard Sanitary Mfg. Co., to Rogers Structural Steel Co.

THE SOUTH

Nada, Ky., 150 tons, State highway bridge, to Midland Structural Steel Co.

CENTRAL STATES

Dearborn, Mich., 430 tons, building for Ford Motor Co., to McClintic-Marshall Corp.

Sioux Falls, S. D., 150 tons, State highway bridge, to McClintic-Marshall Corp.

Waverly, Ill., 115 tons, beam bridge, to Illinois Steel Bridge Co.

Pentiac, Mich., 585 tons, press shop for Fisher Body Co., to Jones & Laughlin Steel Corp.

Lancaster County, Neb., 115 tons, three beam spans, to St. Joseph Structural Steel Co.

WESTERN STATES

San Francisco, 2800 tons, Trans-Bay bridge distribution structure, to Ingalls Iron Works Co.

Seattle, 100 tons, Landsburg dam, to Wallace Bridge & Structural Steel Co.

Los Angeles, 100 tons, tunnel ribs for Metropolitan Water District, to Commercial Shearing & Stamping Co.

Sacramento, Cal., 225 tons, Montgomery Ward building, to Golden Gate Iron Works.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New Britain, Conn., 290 tons, mother house for Sisters of Mercy.

New York Central Railroad, 560 tons, passenger station at Syracuse, N. Y.

New Dorp, S. I., 1100 tons, high school; Federal Construction Co. low bidder.

Washington, 9000 tons, shapes and book racks for Library of Congress annex; Consolidated Engineering Co. low on general contract.

THE SOUTH

Brunswick, Ga., 160 tons, State highway bridge.

Reinforcing Steel

Awards 3500 Tons—New Projects
4500 Tons

AWARDS

Cranston, R. I., 100 tons, junior high school, to an unnamed bidder.

Washington, 500 tons for Panama Canal, to United States Steel Products Co., Washington.

Battle Creek, Mich., 100 tons, industrial plant, to Concrete Engineering Co.

Alton, Ill., 1500 tons, Dam No. 26 in Mississippi River, to Illinois Steel Co.

Ogden, Utah, 175 tons, city reservoir, to an unnamed bidder.

Denver, 450 tons, material for Cherry Creek retarding dam, to Colorado Fuel & Iron Co.

Pullman, Wash., 100 tons, dormitory at Washington State College, to Northwest Steel Rolling Mills Co.

San Jose, Cal., 136 tons, Guadalupe dam, to San Jose Steel Co.

Oakland, Cal., 317 tons, Fourteenth Street wharf extension, to Soule Steel Co.

South San Francisco, 100 tons, subway for Southern Pacific Co., to Concrete Engineering Co.

NEW REINFORCING BAR PROJECTS

Hartford, Conn., Metropolitan District, 128 tons, second section of Bills Brook dam.

Buffalo, 250 tons, William Street grade elimination for Erie Railroad; Freeman-Jones, Inc., Cleveland, low bidder for general contract.

Zanesville, Ohio, 100 tons, for relocation of Wheeling & Lake Erie tracks at Beach City reservoir; bids to be taken by United States Engineers, Zanesville, about June 26.

Cleveland, 270 tons, administration building for Easterly sewage disposal plant; bids May 31.

Chicago, 400 tons for Liquid Carbonic Co.

Racine, Wis., tonnage being estimated, public school building.

Chicago, tonnage not stated, for Cromwell Paper Co.

San Francisco, 100 tons, girls' high school; bids May 29.

Los Angeles, 2450 tons, unit No. 1 of White Point outfall sewer; bids July 7.

Los Angeles, 575 tons, County bridge at Del Valle Avenue over Verdugo, Wash.; bids soon.

State of California, 112 tons, highway work in five counties.

Fresno, Cal., 317 tons, Hall of Records; new bids soon.

Scrap Prices Rise At St. Louis

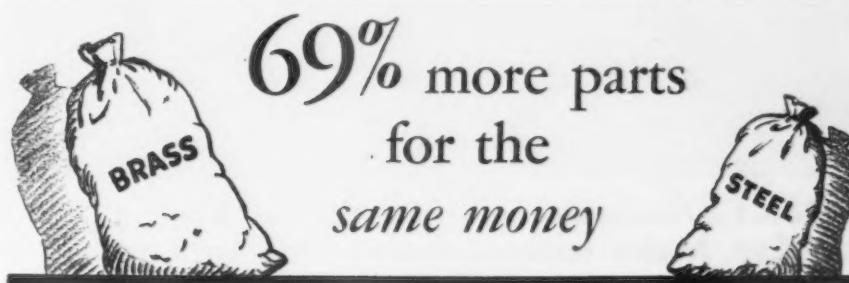
ST. LOUIS, May 21.—A steady pickup in business during the last 12 days is reported by the Granite City Steel Co., which notes an improvement also in sentiment as to the future. Business in tin plate is good, tank plates are in better demand, and the volume in galvanized sheets is fair. The Engineering Construction Co.,

New York, which was awarded the general contract for Dam No. 26 near Alton, Ill., has placed 1400 tons of reinforcing bars and 5000 tons of steel sheet piling with the Illinois Steel Co.

The scrap market is reported firm and higher for some items, with buyers still holding off and very little material being offered. No. 1 heavy melting steel, No. 2 heavy melting miscellaneous standard section rails, and No. 2 wrought are 25c. a ton higher, and railroad springs and railroad malleable are \$1 up. Of the railroad

lists reported last week as closing, very little is said to have come to St. Louis.

Shipments of pig iron are still rather low, due, it is believed, to the heavy takings prior to the freight rate advance of a month ago. Stove production is said to be about 15 per cent less than at this time a year ago, due to heavy activities then prior to a wage advance, but it is stated that orders booked for the next two or three months will bring the output ahead of last year. The implement trade still is busy.

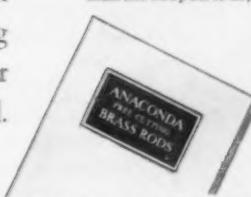


BRASS . . . does cut costs on many screw machine products

One manufacturer changed from steel stock to Brass and got 69% more filler caps per dollar of cost! How he did it is told in complete detail in our new 20-page booklet which contains other comparative cost figures.

Nor is that all! Tool life, tool breakage, power consumption are discussed. Special shapes that save their extra metal cost many times over by eliminating expensive operations are depicted in actual size. And, in addition to Brass, Free Cutting Phosphor Bronze, Nickel Silver, Everdur, and other Anaconda Free Cutting Alloys are also described.

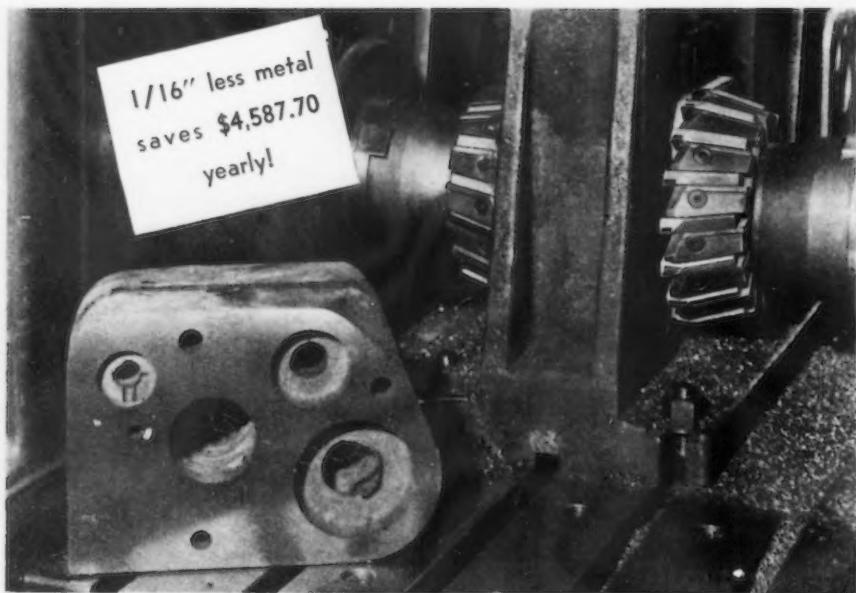
If you make, sell, buy or use screw machine parts of any metal, you'll want this booklet . . . For your copy, mail the coupon today.



185

The American Brass Co., Waterbury, Conn.	
Please send me a free copy of your new Brass Rod Booklet, Anaconda Publication B-14, by return mail.	
Name	Title
Company	
City	State

ANACONDA COPPER & BRASS



Don't Overlook This Additional Saving You Can Make with Carboloy Milling Cutters

With Carboloy you can take LIGHT cuts under scale—skim cuts if necessary—and still get long cutter life. Ordinary cutters can't do this; you must provide a large amount of waste metal to allow the cutters to get well under the tough scale. Hence, with Carboloy, you can reduce your casting size and save money.

In the application shown above, the

casting was reduced $1/16"$ on all faces to be milled. Net yearly saving of \$4,587.70 in metal was made. This saving was possible ONLY by the use of Carboloy cutters.

Investigate Carboloy cutters for worthwhile savings on YOUR jobs. You'll get higher speeds, faster feeds, greater accuracy, long cutter life PLUS a substantial saving of surplus metal usually wasted!

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BLADES FOR ALL
ADJUSTABLE
MILLING CUTTERS

CARBOLOY

Reg. U. S. Pat. Off.

Steel Buying Drops in Valleys Because Of Code Uncertainty; Scrap Stronger

YOUNGSTOWN, May 20.—Shipments of finished steel are running moderately ahead of those in the first three weeks in April. A down-trend in bookings, however, has been in progress during the past week. Settlement of the automotive strikes has failed to stimulate a heavier flow of orders for automobile steel; in fact, fresh demand from motor car manufacturers has diminished noticeably. This trend is taken as an indication that steel stocks at most automobile centers still are moderately heavy and that further buying for 1935 assemblies will continue on a reduced basis.

Other classes of steel consumers served by Valley producers are becoming more cautious in placing orders. Seasonal declines in activity in some consuming industries are the primary cause, while the uncertainty that is spreading as a result of the Senate's passage of the Wagner labor disputes bill and conjecture regarding disposition of the iron and steel code next month are secondary deterrents to sustained steel buying.

The moot point in discussions of the code concerns prices. The immediate outlook for steel quotations, so far as most Valley steel producers are concerned, is quite

clear. The filing of third quarter quotations this week is not expected to reveal any changes in the present bases for all steel products. The extension of the steel code, however, is considered essential by leading interests here, if price stability is to be maintained. Moreover, the continuance of the present provisions relating to quoting steel prices is considered particularly desirable in the face of pending labor legislation that may place additional cost burdens upon steel makers.

Until these major issues are settled, steel production in the Valleys and nearby northern Ohio mills is expected to tend downward. Schedules in the current week are being revised, but ingot output in the aggregate will average not much lower than production in the past week. Bessemer schedules are well sustained.

General Motors Holds Bargaining Conferences

DETROIT, May 21.—Conferences to determine the collective bargaining status of American Federation of Labor committees in individual plants of General Motors Corp. are to get under way today. The first meeting is to be at the Fisher Body plant at Cleveland, with William S. Knudsen, executive vice-president, representing the corporation, and Francis D. Dillon, the A. F. of L. After an agreement is reached at Cleveland, similar meetings will be conducted at the Norwood, Ohio, and Atlanta, Ga., assembly plants of Chevrolet.

It is understood that negotiations will then be extended to other General Motors plants, including Buick and the two Fisher Body factories at Flint.

These meetings are an outgrowth of the Toledo strike settlement. Upon the understandings arrived at depends in large measure whether the A. F. of L. will keep the peace in the months immediately ahead.

Members of the Mechanics Education Society have presented demands to the four Fisher Body plants in Detroit for higher wage rates, claiming that living costs have increased sharply in this city. The inference is that if a satisfactory settlement is not reached the M.E.S. will call a strike of its tool and die workers in the Fisher plants, one of which is said to be the largest in the industry. It is considered significant that the M.E.S. is taking this action just prior to the beginning of the season for tooling up for 1936.

Cast Iron Pipe

Brockton, Mass., has awarded 265 tons of 18 and 24-in. to R. D. Wood Co.

Smithfield, R. I., will readvertise soon for bids on about 1200 tons of 6 to 12-in.

Milwaukee has awarded 1500 tons to an unnamed bidder.

Jackson, Mich., has placed 300 tons with United States Pipe & Foundry Co.

Guthrie, Okla., closes bids May 29 for 48,970 ft. of 4, 6, 8, 12 and 16-in. for water system; also for 30 tons of standard and special fittings, 300,000-gal. steel tank on 110-ft. steel tower, 200,000 gal. steel tank on 118-ft. steel tower, and other waterworks equipment. Mahler & Ritzhaupt, Guthrie, are consulting engineers.

Grand Island, Neb., plans pipe line in Huston Avenue for water supply.

Scottsburg, Ind., asks bids until May 27 for 2512 ft. 4-in. for water supply; also for 75-gal. per min. deep well turbine pumping unit and accessories. John W. Moore & Son, Indiana Pythian Building, Indianapolis, are consulting engineers.

Washington County Sanitary District No. 1, Abingdon, Va., plans pipe lines for water system. Special election has been called for June 11 to vote bonds for project.

Rensselaer, N. Y., plans water pipe lines. Fund of \$500,000 is being arranged through Federal aid for this and other waterworks installation.

Longview, Tex., has authorized surveys for new 18-in. main water line from Big Sandy Creek to city limits, about 22 miles. Cost about \$400,000 with dam and other waterworks construction. Myers, Noyes & Forrest, Tower Petroleum Building, Dallas, Tex., are consulting engineers.

Eureka, Utah, plans water pipe lines. Fund of \$50,000 is being secured through Federal aid for this and other waterworks equipment. A. Z. Richards, Salt Lake City, Utah, is consulting engineer.

Hustonville and Moreland, Ky., associated, plan joint pipe line to Junction City, Ky., for water system; also elevated steel tank and tower in each municipality and booster pumping equipment. Fund of about \$62,000 will be arranged through Federal aid. Howard K. Bell, McClelland Building, Lexington, Ky., is consulting engineer.

Jacksonville, Ore., has postponed closing of bids from May 23 to May 27 for about 9380 ft. of 6 and 8-in. for water system. D. T. McDonough, City Hall, Medford, Ore., is consulting engineer.

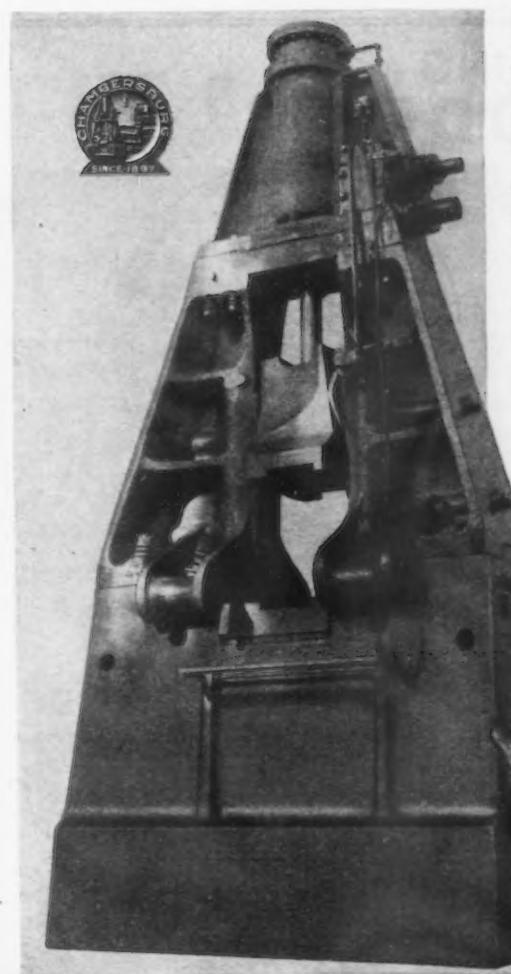
Skiatook, Okla., will soon take bids for about 12 miles of 8-in. for water supply from Mohawk pumping station, Tulsa, Okla., to municipal limits. Bond issue of \$93,000 has been approved. Victor H. Cochrane, Wright Building, Tulsa, is consulting engineer.

Mabton, Wash., plans water pipe lines. Fund of \$42,000 has been secured through Federal aid for this and other waterworks construction.

Wellington, Kan., plans early call for bids for 16,000 ft. of 20-in. for main water supply; also for filtration plant, pumping station and other waterworks equipment. Fund of \$100,000 has been arranged. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Los Angeles has let contracts for 5150 tons for delivery during next quarter as follows: 3700 tons to United States Pipe & Foundry Co., 750 tons to American Cast Iron Pipe Co., and 700 tons to National Cast Iron Pipe Co.

Los Angeles will probably take bids July 2 on 5630 ft. of 60-in. required for White Point outfall sewer.



Proven Profitmaking Possibilities of the new Model E Chambersburg Steam Drop Hammer:

1. Power saving—15% to 40%.
2. More accurate forgings through maintenance of alignment by means of heavier, more rigidly assembled parts.
3. Work per blow increased without sacrificing control, by rapidly accelerated blow and quick return of ram.
4. Forgings can be made at higher temperatures, because of this speed.
5. More continuous operation by elimination of causes of down-time.

This remarkable hammer, which is already setting new production records in some of the largest and most progressive forge shops in the country, is a revelation to all forge shop men who have a chance to check its performance. Details will be given gladly by any Chambersburg-National representative. Bulletin 255 will be mailed on request.

CHAMBERSBURG MODEL E STEAM DROP HAMMER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

Sold by • CHAMBERSBURG-NATIONAL • Sales Offices

COMPLETE FORGING EQUIPMENT

NEW YORK CHICAGO DETROIT
TIFFIN, OHIO 152 W. 42nd St. 565 Washington St. 1235 Book Bldg. CHAMBERSBURG, PA.

Bainville, Mont., will purchase 145 tons through a general contractor.

Eureka, Cal., has opened bids for 114 tons of 6-in.

Parowan, Utah, opened bids May 23 on 304 tons of 2 to 8-in.

Fountain Green City, Utah, will take bids May 24 on 312 tons of 2 to 8-in.

Kamas, Utah, will open bids June 4 on 145 tons of 2 to 6-in.

Oakland, Cal., East Bay Municipal Utility District, has opened bids on 3000 tons of 4 to 20-in.

Spokane, Wash., has taken bids on 118 tons of 12-in.

Railroad Equipment

Bangor & Aroostook will soon purchase two freight locomotives; also buy material for rebuilding two caboose cars in shops at Derby, Me.

Cambria & Indiana will close bids today on repairing hopper-bottom coal cars.

New York Rapid Transit Co. has ordered 15 articulated five-section train units from Pullman-Standard Car Mfg. Co. and 10 units from St. Louis Car Co.

Illinois Central has ordered a Diesel locomotive from American Locomotive Co.

RAILS

Wheeling & Lake Erie is expected to buy 1000 to 2000 tons of rails shortly.

Pittsburgh & Lake Erie is in the market for about 1000 tons of rails.

ARC WELDING ELECTRODES

STAINLESS
and HEAT
RESISTING

If you weld stainless alloys buy from the oldest company producing Alloy Electrodes exclusively and serving the world's leading steel producers and users. All popular analyses of chrome and chrome-nickel electrodes carried in stock.



MAURATH, INC.

7400 Union Ave., Cleveland, Ohio

Activities Bearing on Machine Tools Distribution

A Department Conducted by L. M. Waite

Federal Aid for the Purchase of Machine Tools

A PROMINENT machine tool manufacturer is advising his dealers of the possibility of Government aid in selling machine tools to anyone who is the owner of a building or piece of property, or has a lease for six months longer than the period of a loan. He states that the Federal Housing Administration service is available up to an amount of \$2,000. With the property or lease condition satisfied, it is required that the prospect make out a property owner credit statement, obtainable from the local Federal Housing Administrator, and present same to the banker qualified to do business under the act. "He will take a note and give you a check before the merchandise is delivered." These loans are on the basis of a total annual charge of \$5 for each

\$100; no down payment. The credit period extends over 36 months. Either any local Federal Housing Administrator or the Better Housing Bureau can supply full details.

Wide Area Coverage

H. B. KRAUT, president, Giddings & Lewis Machine Tool Co., Fon du Lac, Wis., on an Eastern trip, reports the plant very reasonably busy on orders well distributed over areas east of the Mississippi River. The company has some Government orders and a number of good orders from the Far East. Very few bookings are on hand from continental Europe.

Thomas Prosser & Sons, New York, distributors of cemented carbide cutting tools, report a 40 per cent increase in business over

the first quarter of 1934 in the Detroit area. The increase in inquiries as well as in orders has warranted that the company open its own Detroit office and there carry a large stock for the benefit of Michigan and Ohio trade. The company reports other areas as holding at about the 1934 level of sales. Distribution is handled in some areas by dealers and in others by direct representation.

Among Dealers

ANDYCK CHURCHILL CO., New York, New Haven, Conn., and Philadelphia, report a very satisfactory business since May 1. The company announces the agency for Edlund Machinery Co., Cortland, N. Y., for all three of its offices.

A prominent dealer, having offices in several areas, reports the first 10 days of May as quiet, while the second 10 days were sufficiently productive of orders to bring the May average up to the average of the preceding months of the year.

A majority of dealer areas report May as failing to develop any order spurt beyond that set by the first three months of the year, although many dealers look for a good final week in May.

Japan

ORDERS have materialized from some of the comparatively recent quotations on new equipment for Japan. Additional inquiries are reported as having been received. The search for satisfactory used machines continues.

Sailed

JULES DIERCKX, authority on die castings, sailed May 21, on the Empress of Britain, for a six weeks' trip to England and several Continental points.

Railroad-Machinery Clubs Merged

THE merging of the Machinery Club of the City of New York and the Railroad Club, in the quarters of the latter on the 21st and 22d floor of the Hudson Terminal Building at 30 Church Street, New York, as the Railroad-Machinery Club, has been completed.

The loss of club identity, feared by many members, has not materialized. Under the new arrangement, familiar faces of veteran employees are to be seen at customary

departmental duties under the direction of Frank C. Bedell, assisted by E. H. Jones. Mr. Bedell was made superintendent of the Machinery Club when it was founded in April, 1907. Many other employees of long standing, help to continue old traditions of Machinery Club hospitality and service, which, over the long period of years, made hundreds of guests from machine tool, metal working and allied fields look forward to Machinery Club luncheons and to the panoramic views of New York City, the Hudson River and adjacent areas, from the club rooms and roof. These features are retained in the new quarters.

It is interesting to note that the President of the Machinery Club, for the final official term up to the merger, was Edwin A. Stillman, son of the Machinery Club's first president, Francis H. Stillman, deceased.

For the benefit of former members, out-of-town members and those who have been guests of the Machinery Club during the past years, we list the names of a few of the prominent old-timers who are seen regularly at the Railroad-Machinery Club. It is hoped that such listing will serve, in a widespread way, to recall pleasant occasions and in the renewing of acquaintanceships which may have been dropped during depression restrictions.

Henry Abbott	C. E. Lucke
John Allen	J. F. McKeenan
Walter H. Allen	D. H. McPherson
A. S. Ames	W. F. McCarthy
J. W. Ames	J. C. Meem
Paul Bonner	E. H. Neff
Lucian C. Brown	G. A. Nelson
Garrett Burgert	W. W. Nichols
W. P. Bowman	L. C. Nichols
C. H. Bickell	T. P. O'Brian
H. C. Carpenter	Henry Prentiss
George Crouch	D. W. Pye
John F. Dempsey	A. F. Ralf
Arthur N. Dugan	D. J. Rowland
Judson Hayward	Alonzo B. See
Joe Hazley	G. A. Schieren
W. E. Hedgcock	Harrie V. Schieren
George A. Howells	George Slate
C. C. Hubbell	H. S. Usher
F. W. Iredell	E. W. Van Houten
G. Keegan	J. S. Warde
Ed Laterman	Lou. Wilson
H. G. Lee	P. R. Wilson

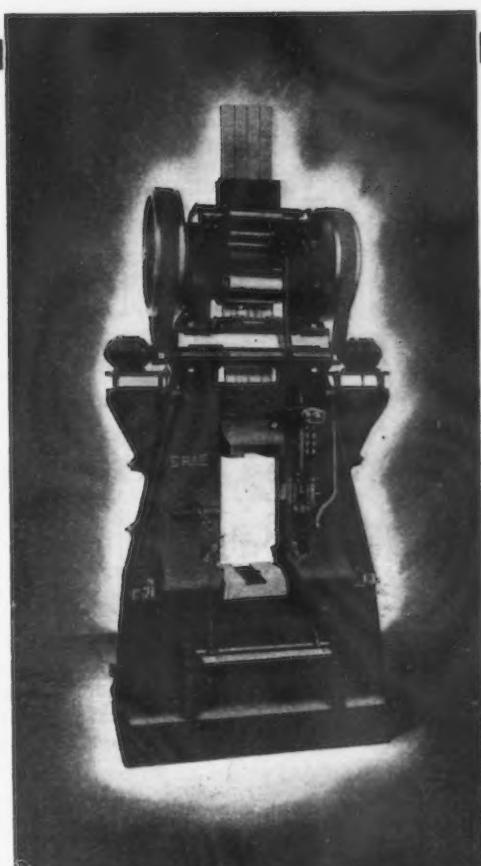
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An International Viewpoint

A RECENT visit with the American representative of a large international organization dealing in machine tools developed interesting information concerning the foreign buying of used tools.

Such buying is seldom associated with purchases for standard production. Rather, it generally con-

THE 84% STEP-CHILD



The recent survey by the "American Machinist" shows that 84% of the hammers in the country are more than ten years old, a percentage exceeded by only one other class of equipment. The only explanation is that the forge shop is the step-child of the plant, in most shops.

Hammers have been improved in the last ten years. The new ERIE hammers will show you startling increases in production, in die life, in economy of operation. New forge shop equipment will show greater return for your investment than will money spent in any other department.

Start today to modernize your forge shop. Write Erie for complete information on modern hammers and presses.

ERIE FOUNDRY COMPANY ERIE, PENNA., U. S. A.

DETROIT:
CHICAGO:

335 CURTIS BUILDING
548 WASHINGTON BLVD.

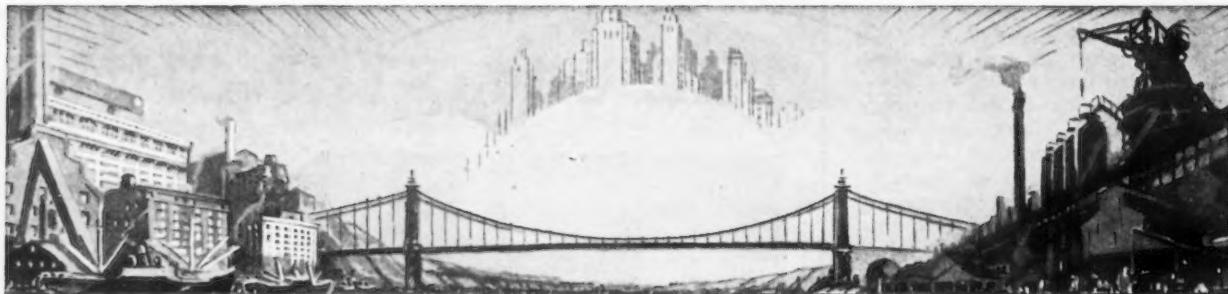
INDIANAPOLIS: 335 POSTAL STATION BUILDING
PARIS, FRANCE: 8 RUE DE ROCROY



cerns equipment for use in the making of any product for which there is an unexpected temporary demand, often created by some international political bartering pertaining to tariff. At the expiration of the demand it is seldom attempted to operate the equipment in competition with well organized production.

In reference to foreign need for new tools it was emphasized that foreign engineer-buyers have keen ability for recognizing advanced

types of standard machines and that these must not possess too much in the way of single-purpose characteristics. The nativity of equipment is of little moment to large plant operators except under conditions of interference by the administrative authority of governments. At the moment the American office of this organization no longer purchases American equipment for offices in other countries. The buying is done direct by each office.



Plant Expansion and Equipment Buying

Machine Tool Purchases by Automobile Makers Starting—Other Sales Fair

INTEREST in the machine tool market is rapidly shifting to Detroit, where automobile makers are showing their first real interest in months.

Buick is reported to have placed orders recently and Oldsmobile is in the market. Representatives of the French Mathis organization, a Ford affiliate, are in this country to buy tools. Chrysler is entering the market for tools to cut production costs. It is now likely that the peak of automotive retooling activity will be reached in August.

Tool sales to other industries are fairly well maintained. The Loew Mfg. Co., Cleveland, has taken quotations on about 75 machines which will be installed in its new Chicago plant. The Hercules Motor Co., Canton, Ohio, has bought about 10 tools, including radial drills, milling machines and automatic screw machines. A western Pennsylvania plant has ordered seven brass-working turret lathes.

◀ NORTH ATLANTIC ▶

Mack International Motor Truck Corp., 25 Broadway, New York, with main plants at Plainfield and New Brunswick, N. J., has leased multi-story building to be erected at 604 West Forty-third Street, New York, for new metropolitan factory branch, storage and distributing plant, with parts and repair departments. Cost over \$100,000 with equipment. Elwyn E. Seelye & Co., 101 Park Avenue, New York, are consulting engineers.

Signal Supply Officer, Army Base, Brooklyn, asks bids until May 27 for 24 motors (Circular 129); until June 8 for 980 guys (Circular 181), 8000 electricians' knives (Circular 184); until June 10 for 5200 insulators and 118,000 beads (Circular 133).

Board of Education, Manhasset, L. I., plans manual training department in new multi-story high school, for which bids have been asked on general contract. Cost about \$415,000 with equipment; financing has been arranged in that amount. Smith & Ward, 100 East Forty-second Street, and Tooker & Marsh, 101 Park Avenue, are architects; Elwyn E. Seelye & Co., 101 Park Avenue, are consulting engineers, all New York.

Mexican Petroleum Corp., 122 East Forty-second Street, New York, plans two-story addition to bulk oil storage and distributing plant at Carteret, N. J., to be used in part for steel drum division. Cost over \$30,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 28 for 58,000 lb. admiralty metal con-

denser tubes for Brooklyn Navy Yard (Schedule 5116); until June 4, aluminum chairs for Brooklyn, Mare Island and Puget Sound yards (Schedule 5128); until June 7, lighting and power cable, double conductor cable, brush-holder cable, twisted pair telephone cable, multiple conductor cable, etc., for Brooklyn and Mare Island yards (Schedule 5144).

Briguglio, Schnee & Gaddie, 135-14 Hillside Avenue, Jamaica, L. I., general contractors, have plans for new two-story building for storage, distribution and reconditioning service, with repair and garage unit at 23-31 Borden Avenue, Long Island City. Cost about \$40,000 with equipment.

Zierick Mfg. Corp., Bronx, New York, has been organized by Thomas J. Schaad, 255 West Lena Avenue, Freeport, N. Y., and Arthur Schneider, 184 Clarkson Avenue, Brooklyn, to manufacture automobile parts and electrical specialties.

Board of Trustees, Pratt Institute, 215 Ryerson Street, Brooklyn, has let general contract to Tide Water Building Co., 101 Park Avenue, New York, for three-story addition to engineering building of School of Science and Technology. Cost about \$100,000 with equipment. John Mead Howells, 154 East Forty-sixth Street, New York, is architect.

Bureau of Yards and Docks, Navy Department, Washington, is securing an appropriation of \$400,000 for extensions and improvements in buildings and equipment at Naval Air Station, Lakehurst, N. J., including fund of \$75,000 for non-rigid airship development at that place. Bureau is asking bids until May 29 for electrical

equipment and new power wiring at Navy Aircraft Factory, Navy Yard, Philadelphia (Specification 7913).

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until May 28 for one motor-driven machine coil winder and one coil winder (Req. 5115), control pulleys for aircraft use (Req. 985 Aero), 75 casters and 75 wheels (Req. 989 Aero), two hand-operated hydraulic arbor presses, capacity 35 tons (Req. 5254).

Merck & Co., Inc., 916 Parrish Street, Philadelphia, manufacturer of industrial chemicals, etc., plans rebuilding part of plant at South Philadelphia, recently destroyed by fire. Loss about \$75,000 with equipment. Headquarters are at Rahway, N. J.

Paper Products Mfg. Co., Swarthmore, Pa., manufacturer of tissue and other paper, has purchased former Rockland mill of Jessup & Moore Paper Co., near Wilmington, Del., comprising several buildings and large tract of land, and will remodel for another plant. Cost over \$75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 28 for one honing machine (Schedule 5111), one grinding machine (Schedule 5112), one internal grinding machine (Schedule 5113), one milling machine, all motor driven (Schedule 5129), for Philadelphia Navy Yard.

◀ BUFFALO DISTRICT ▶

Buffalo Steel Co., Fillmore Avenue, Tonawanda, N. Y., has approved plans for one-story addition for storage and distribution. Cost about \$35,000 with equipment.

Excel Metal Cabinet Co., Jamestown, N. Y., plans expansion in factory at Falconer, N. Y. Financing in amount of \$36,000 has been arranged for work.

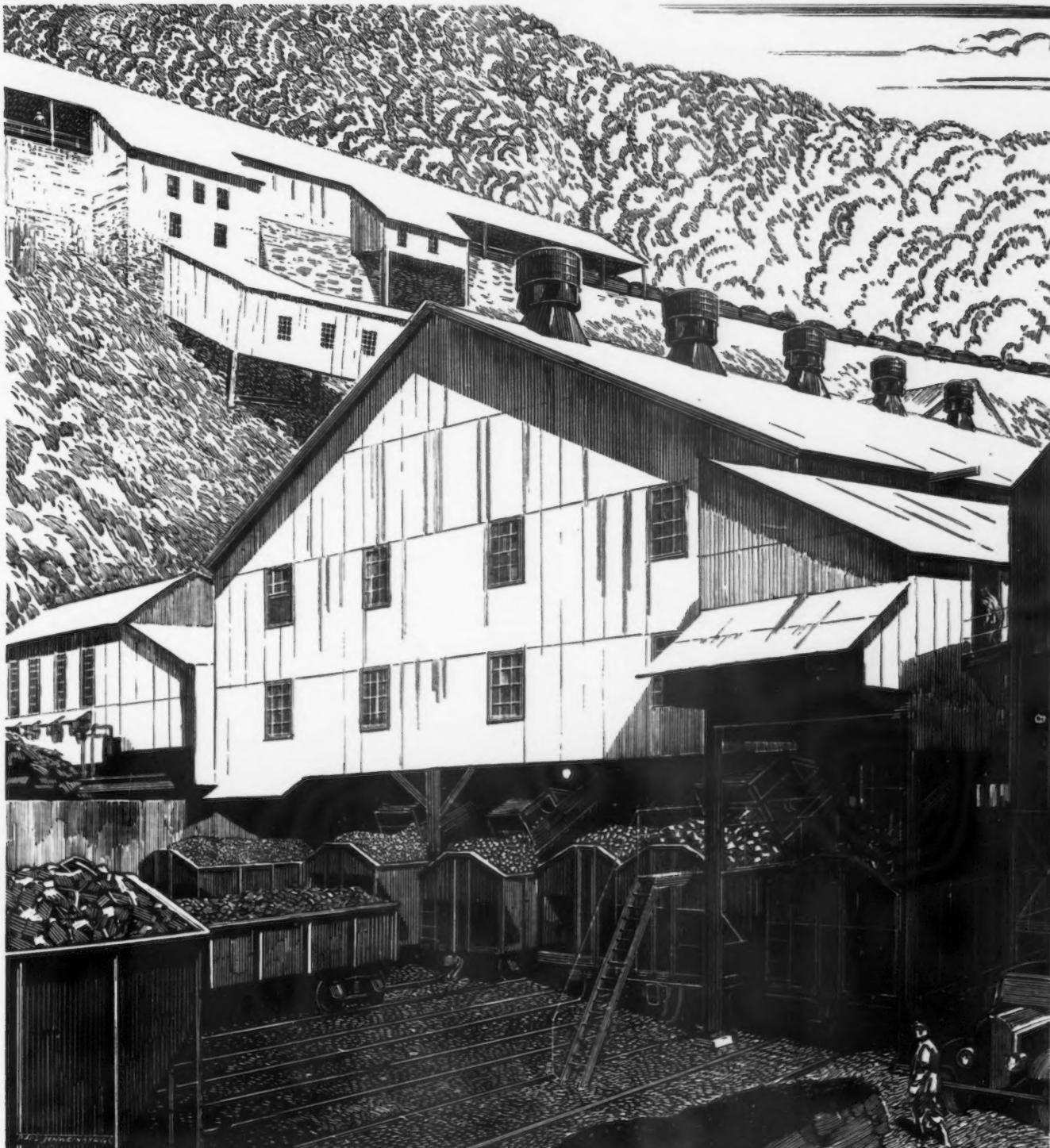
Farm King Packing Co., Inc., Fredonia, N. Y., has been organized by Nicholas G. Heary, 288 East Main Street, and associates, to build one-story food products canning plant, for which site was recently purchased. Cost over \$30,000 with machinery. Mr. Heary was formerly general manager for Red Wing Grape Juice Co. Ernest G. Heary, 710 Park Avenue, Dunkirk, N. Y., will be an official of new company.

◀ NEW ENGLAND ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 28 for one motor-driven grinding machine for Boston Navy Yard (Schedule 5118); until June 7, eight motor-driven centrifugal pumps and spare parts for Boston, Norfolk, Mare Island and Puget Sound yards (Schedule 5136).

Barrett Co., Beacham Street, Everett, Mass., manufacturer of roofing products, road oils, etc., has plans for new storage

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READY AVAILABILITY



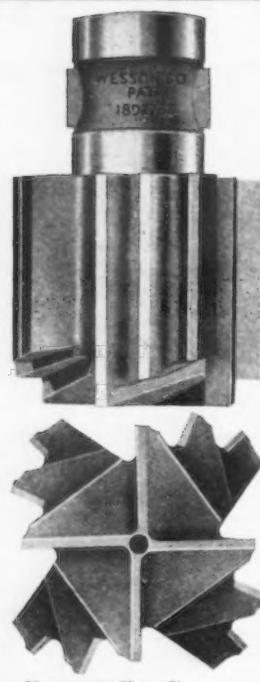
With mines located on nine railroads and with efficient, high speed loading equipment, Koppers coals are readily available for use in the great industrial areas of the country. Koppers ships to lake ports and Atlantic tidewater piers as well as by "all rail" routes. The size and stability of the company, and the variety of coals mined, make Koppers an excellent source of supply.

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and distributing plant at Malden, Mass., including steel tank. Cost about \$45,000 with equipment. Company headquarters are at 40 Rector Street, New York.

Atlas Yeast Corp., North Grafton, Mass., plans rebuilding part of plant recently destroyed by fire. Loss close to \$100,000 with equipment.

Bird & Son, Inc., East Walpole, Mass., manufacturer of roofing and building board products, etc., has let general contract to Vappi & MacDonald Co., Inc., 240 Sidney Street, Cambridge, Mass., for one-story plant additions in Norwood district. Cost over \$30,000 with equipment. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

Lawrence Machine & Pump Corp., Lawrence, Mass., has been organized by Victor J. Mill, 371 Market Street, and associates, to manufacture pumping machinery and other mechanical equipment.

◀ WESTERN PA. DIST. ▶

Board of Trustees, Edinboro State Teachers' College, Edinboro, Pa., plans new power plant for central steam heating service. Cost about \$180,000 with equipment and pipe lines. Appropriation of about \$600,000 is being arranged for this and other expansion at college. Dr. Carmon Ross is president.

Bethlehem Mines Corp., Barrackville, near Fairmont, W. Va., plans rebuilding tipple and other plant units at coal mining properties recently destroyed by fire. Loss close to \$200,000 with equipment.

School District, Wilkinsburg, Pa., H. R. Schweinberg, secretary, asks bids until June 5 for motor drive for stoker controller in school power plant.

◀ OHIO AND INDIANA ▶

Sanitary Tinning Co., 3753 East Ninety-third Street, Cleveland, has plans for one-story addition, 50 x 135 ft. Cost over \$40,000 with equipment. Raymond D. Parson, 17815 Clinton Boulevard, is architect.

Southern Ohio Electric Co., Athens, Ohio, plans addition to electric power plant at Floodwood, Ohio. Cost over \$200,000 with equipment.

City Council, East Palestine, Ohio, has authorized bond issue of \$47,500, fund to be

used for extensions and improvements in municipal electric light and power plant, including equipment.

General Screw Products Co., Cleveland, has been organized by Victor S. Leanza and C. H. Bernard, care of John H. Morris, 1208 Citizens' Building, representative, to manufacture screw machine products.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until May 28 for flexible conduit (Circular 741), 30 tail wheel assemblies (Circular 740); until June 3, 64 gasoline flow meters (Circular 744); until June 7, flight indicator assemblies (Circular 736), 462 parachutes, complete (Circular 738); until June 10, 110 electric inertia starter assemblies.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, plans one-story addition to plant at Zanesville, Ohio, for storage and distribution. Cost over \$45,000 with equipment.

Forest G. Smith, vice-president, Lima Ice & Coal Co., Lima, Ohio, is at head of project to erect a new power plant on local site for industrial service. Cost close to \$200,000 with equipment.

Acme-Evans Co., 852 Washington Avenue, Indianapolis, plans expansion in grain storage and distribution facilities at flour mill, with construction of new storage tanks and installation of elevating, conveying and other mechanical-handling equipment. Cost about \$50,000 with equipment.

◀ SOUTH CENTRAL ▶

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 31 for air compressors and auxiliaries for permanent installation at Norris and Wheeler power plants; until June 4, one 62 ft. x 38 ft. whirley barge, complete with steam whirley crane, spud engines and accessory equipment for Pickwick Landing dam, Tennessee River.

Central States Power & Light Co., Benton, Ky., plans transmission line to point near Paducah, Ky., where connection will be made with system of Kentucky-Tennessee Light & Power Co. Cost over \$30,000.

Brown-Forman Distillery Co., 1908 Howard Street, Louisville, has let contract to International Steel Co., Evansville, Ind., for mechanical-bottling works and multi-

story storage and distributing building. Cost over \$75,000. Lester V. Abbott, 8 Kenwood Village, Louisville, is architect.

Plough, Inc., Memphis, Tenn., manufacturer of chemical products, etc., will take bids at once on general contract for new multi-story plant, about 150,000 sq. ft. floor space, including high-pressure steam installation for processing service, electric light and power facilities, etc. Cost about \$500,000 with equipment. Arthur L. Nelson Engineers, Park Square Building, Boston, is mechanical engineer.

United States Engineer Office, Louisville, asks bids until May 28 for four pump cases, two impellers and accessory pump parts, etc. (Circular 306).

Kentucky Brewing Co., 1445 South Fifteenth Street, Louisville, has plans for a mechanical-bottling works. Cost over \$40,000 with equipment. G. W. Abell is company architect.

◀ WASHINGTON DIST. ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until May 29 for eight electric-operated bridge cranes and one manually-operated bridge crane for Norfolk, Va., Navy Yard (Specification 7848).

Board of District Commissioners, District Building, Washington, will soon take bids for equipment for two power plants and sludge dewatering stations for sewage treatment works at Blue Plains, where initial work is under way; cost about \$718,000. Entire project will cost close to \$5,000,000. Metcalf & Eddy, Statler Building, Boston, are consulting engineers.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until June 7 for hacksaw blades, drills, pliers, wrenches, tackle blocks, crowbars, pumps, tool handles, screw drivers, flashlights, batteries and other tools, etc. (Circular 137); until June 10, one bench grinder, bolt clippers, grease guns, gages, jacks, bolts, nuts, screws, flat washers, lock washers, cotter pins and other equipment (Circular 135).

German Brewing Co., Cumberland, Md., has plans for new multi-story brewery. Cost about \$70,000 with equipment.

Quartermaster, Marine Corps, Washington, asks bids until May 28 for rigid steel conduit, flush plates and six distribution transformers (Schedule 717).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 4 for screws, bolts, nuts and rivets for Eastern and Western yards (Schedule 5095).

◀ SOUTHWEST ▶

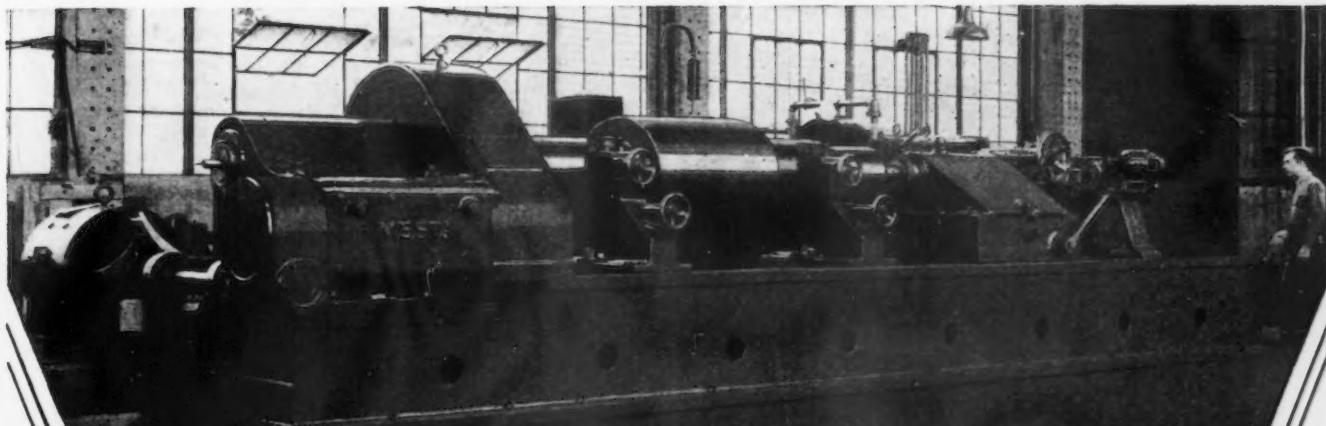
City Council, Independence, Mo., James S. Craig, city clerk, asks bids until May 27 for turbine auxiliaries, surge tank, feed pumps, air preheater, and complete accessory equipment for municipal electric light and power plant. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Dennebien Wholesale Liquor Co., Baltimore Avenue and Twenty-first Street, Kansas City, Mo., plans one-story addition to storage and distributing plant, 25 x 60 ft. Cost about \$25,000 with equipment.

Purchasing Officer, United States Indian Warehouse, 419 South Twelfth Boulevard, St. Louis, asks bids until June 7 for heaters, bake ovens, coal and wood heating stoves, cooking stoves, etc. (Schedule 16), as required during fiscal year 1936.

City Council, Perry, Mo., has rejected bids recently received and will soon take new bids for pumping machinery and accessories, elevated steel tank and tower, pipe lines, etc., for municipal waterworks. Cost about \$50,000. Financing has been arranged. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has let general contract to Patti Construction Co., 1114 Broadway, Kansas City, Mo., for one-story factory branch, 177 x 352 ft., with storage



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and distribution facilities, at Leeds, Mo. Cost over \$100,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Ordnance Officer, Field Artillery School, Fort Sill, Okla., asks bids until June 7 for one tool room lathe (Circular 4).

Rado Refining Co., McAllen, Tex., recently acquired by new interests, headed by Ralph Fair, plans expansion and improvements in oil refinery to double pressure capacity. Cost over \$50,000 with equipment.

Bureau of Water, Houston, Tex., plans installation of booster pumping machinery and accessory equipment, and steel storage tanks at East End water pumping station.

80—THE IRON AGE, May 23, 1935

Ford Motor Co., Dearborn, Mich., has plans for new one-story plant, 100 x 200 ft., at Northville, Mich., for engine valves and allied motor parts production. Cost over \$85,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer.

Accurate Screw Products Co., 1155 Bellevue Avenue, Detroit, has been organized by Herman Winer, 439 Hague Avenue, and associates, capital \$50,000, to manufacture screw machine products.

◀ SOUTH ATLANTIC ▶

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has asked bids on general contract for one-story factory branch and parts plant at Charlotte, N. C. Cost about \$175,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Coca-Cola Corp., 534 East Bryan Avenue, Savannah, Ga., is considering extensions and improvements in local plant, including mechanical-bottling and other equipment. Cost over \$40,000 with machinery. Headquarters are at Atlanta, Ga.

Board of Education, School District No. 1, Bishopville, S. C., plans manual training equipment in new two-story and basement high school. Cost about \$100,000. H. D. Harrall, 717 West Main Street, Benettsville, S. C., is architect.

Common Council, New Smyrna, Fla., plans installation of pumping machinery and accessories, pipe lines, etc., in connection with new municipal water system. Fund of \$80,000 has been secured through Federal aid.

◀ MIDDLE WEST ▶

Quaker Oats Co., 141 West Jackson Boulevard, Chicago, plans addition to branch mill at Saskatoon, Sask. Cost over \$60,000 with equipment.

Purchasing Officer, United States Indian Warehouse, 1749 West Pershing Road, Chicago, asks bids until June 14 for agricultural and other implements as required during fiscal year 1936, including hay forks, steel harrows, wheelbarrows, tongue trucks and scrapers, hay rakes, knives, picks, shovels, plows, post hole-diggers, tool handles, rakes, scythes and other tools (Schedule 12).

Elliott & Co., Thirty-seventh Avenue West and Oneota Street, Duluth, Minn., meat packers, have asked bids on general contract for three-story and basement addition, 61 x 105 ft. Cost over \$65,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect.

City Council, Thief River Falls, Minn., plans extensions and improvements in municipal electric light and power plant. Cost about \$60,000, majority of fund to be expended for equipment. Special election has been called May 28 to approve bonds in amount noted.

Quartermaster Depot, 1819 West Pershing Road, Chicago, asks bids until May 31 for one portable dial-type scale, and 223 330-lb. capacity folding platform scales (Circular 258).

Dubuque Star Brewery, Fourth Street Extension, Dubuque, Iowa, has let general contract to William Yokom, Roshek Building, for three-story addition, 35 x 65 ft., partly for storage and distribution. Cost over \$50,000 with equipment. Richard Griesser, 64 West Randolph Street, Chicago, is architect and engineer.

Water, Light, Power and Building Commission, Hibbing, Minn., Harry Brownell, superintendent, plans extensions and improvements in municipal electric light and power plant, including new turbine unit and other equipment. Cost about \$90,000. Financing is being arranged through Federal aid. Burlingame & Hitchcock, Sexton Building, Minneapolis, are consulting engineers.

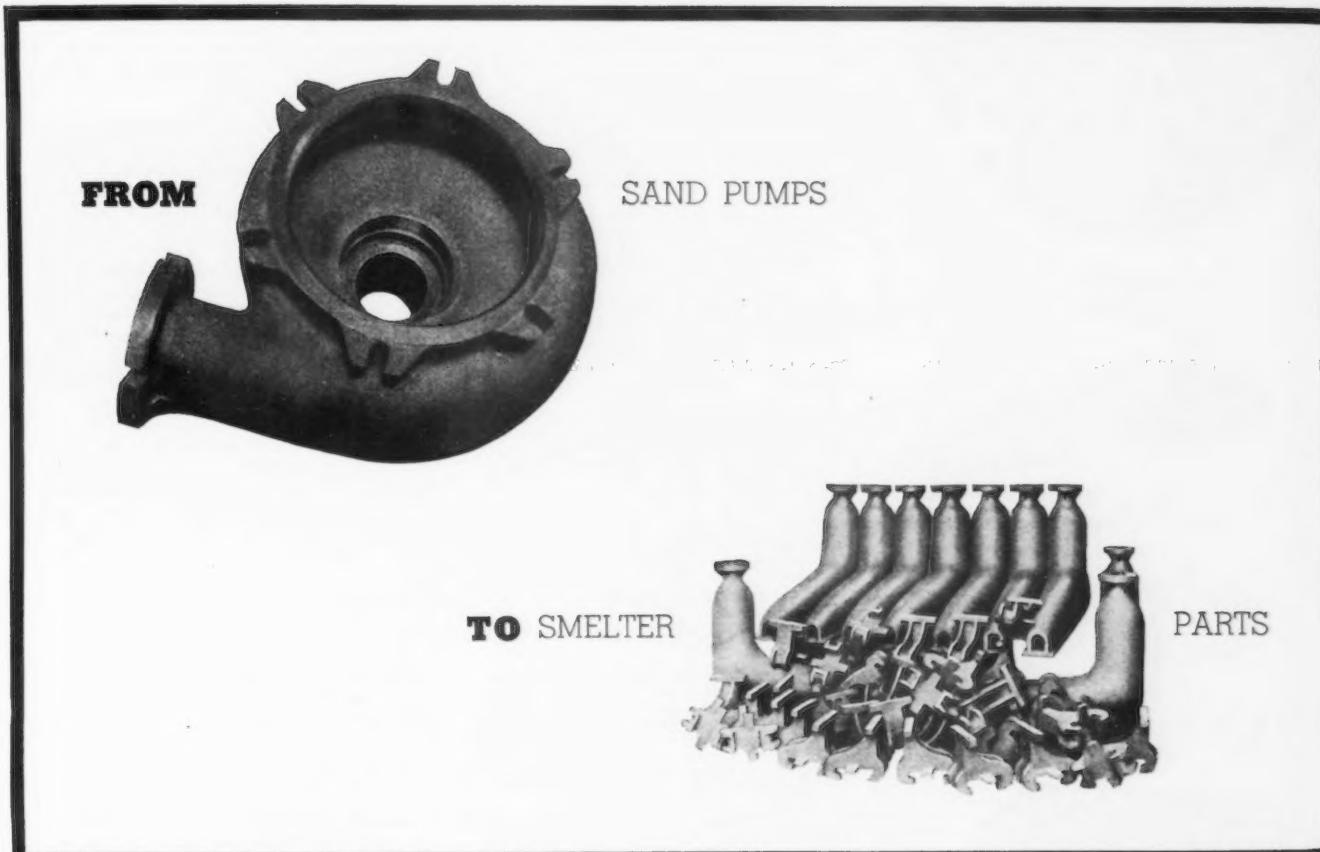
Bond Distilling Co., Green Bay, Wis., is being organized by H. A. Bond to build a \$300,000 bourbon and rye distillery designed by Carl J. Kiefer, consulting engi-

◀ MICHIGAN DISTRICT ▶

Lakeland Refinery, Inc., 1207 City National Bank Building, Lansing, Mich., recently organized, has acquired 12 acre tract, fronting on Grand River, as site for new oil refinery, including by-products division for production of lubricating oils and oils used in paint manufacture. Cost close to \$100,000 with machinery. R. O. McKee, formerly connected with Roosevelt Oil Co., Mount Pleasant, Mich., is president and general manager.

Silver Foam Brewing Co., Battle Creek, Mich., has asked bids on general contract for one-story addition. Cost about \$30,000 with equipment. L. J. Sarvis, Battle Creek is architect.

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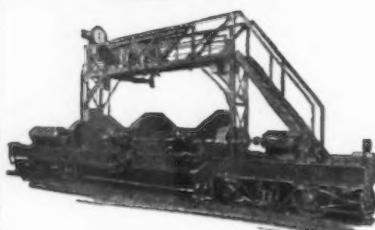
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Electric Cars

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Door Extractors

Coal Charging Lorries,
Coke Guides and Clay Carriers

Atlas Patented Coke Quenching
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Special Cars and Electrically
Operated Cars for every
conceivable purpose.

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Engineers - Manufacturers
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neer, Cincinnati. Work will begin about June 1.

Wisconsin Axle Co., 571 High Street, Oshkosh, Wis., manufacturer of motor truck axles, and affiliate of Timken-Detroit Axle Co., has placed general contract with Ben B. Ganther Co., 78 State Street, for one-story machine shop addition, 30 x 184 ft., to cost about \$75,000 with equipment.

Village of Merillan, Wis., has engaged Walter S. Woods, consulting engineer, 304 Main Street, La Crosse, Wis., to design dam and hydroelectric power plant to cost \$35,000. C. A. Anderson is village clerk.

Dunck Tank Works, 2426 North Thirtieth Street, Milwaukee, specializing in brewery and dairy tanks, has placed general contract with Edward Steigerwald & Sons, Inc., 5310 State Street, for factory extension, 52 x 63 ft., one-story and part basement.

◀ PACIFIC COAST ▶

Ferry Sheet Metal Works, 980 Folsom Street, San Francisco, will soon take bids on general contract for one-story addition, 65 x 80 ft. Cost about \$30,000 with equipment. W. H. Rowe, 216 Pine Street, is architect.

Reiley Brewing Co., Salt Lake City, Utah, care of C. H. Reiley, 1221 East Seventh Street, president, will soon begin construction of new multi-story brewery at 1010 South Main Street. Cost over \$250,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 31, for two motor-driven metal-cutting band saws (Schedule 5092); until June 4, four motor-driven drilling machines (Schedule 5120), one oxy-acetylene cutting machine (Schedule 5143), for Puget Sound Navy Yard.

Joseph Kildall, 610 West Blaine Street, Seattle, is at head of project to operate a two-story food products cannery plant at foot of Harrison Street, where building is being acquired. Two-story extension will be erected, 25 x 150 ft. Cost over \$60,000 with equipment. A company will be organized to carry out enterprise.

Board of Education, Los Angeles, has authorized plans for two one-story manual training shops, Nos. 1 and 2, at high school at Venice. Cost about \$75,000 with equipment. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, Los Angeles, are architects.

American States Water Service Corp., Barstow, Cal., plans extensions in water storage and distribution facilities, including 185,000 gal. electrically welded steel tank, 36 ft. diameter. John Benson is plant manager.

J. M. Smucker Co., Orrville, Ohio, plans new fruit dehydrating plant at Wenatchee, Wash., comprising two one-story units, 60 x 100 ft., and 36 x 130 ft., one for storage and distribution. Cost over \$40,000 with equipment.

Bureau of Reclamation, Denver, asks bids until June 6 for steel and aluminum pipe railings, aluminum doors, steel doors and other metal work for Boulder Dam power plant and appurtenant works, Boulder Canyon Project, Arizona-California-Nevada (Specification 625).

◀ FOREIGN ▶

Coal & Allied Industries, Ltd., London, England, will proceed with superstructure for initial buildings for new plant at Seaham, County Durham, for production of oil from coal. In addition to main distillation units, other buildings will be erected for manufacture of chemical products, with power house and machine shop. Entire project will cost over \$1,000,000 with machinery and is scheduled for completion in 1936.

Anza Brewing Co., Ltd., Mexicali, Mexico, plans new multi-story brewery. Cost over \$150,000 with equipment.

American Crystal Sugar Co., Winnipeg, Man., has plans for new multi-unit sugar mill, with power house, machine shop and other mechanical departments. Cost over \$500,000 with machinery.

TRADE NOTES

T. A. Carty, Baltimore, distributor of arc welding equipment and supplies manufactured by Lincoln Electric Co., Cleveland, has moved from 116 East Centre Street to larger quarters at 1023 Cathedral Street.

Sullivan Machinery Co., Chicago, has moved its general offices from the Wrigley Building, to the Bell Building, 307 North Michigan Avenue.

John Waldron Corp., through its sales staff, will handle the sale of its products direct in place of through Smith & Serrall, Newark, N. J., who have functioned as general sales agents heretofore, effective July 15.

Brown Instrument Co., Philadelphia, manufacturer of instruments and controls, and the Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., manufacturer of control systems and regulators, have opened a joint office at 303—the 101 Marietta Street Building, Atlanta, Ga., to serve the Southeast. Wesley R. Moore, for a number of years district manager of Brown Instrument Co., is manager in charge, with Leon L. Kuempel, sales engineer, Charles A. Kitzinger, service engineer, and J. A. Crawley, office manager. A Minneapolis-Honeywell stock will be carried, and complete sales and installation service maintained at this office for the complete lines of both companies.

Republic Steel Corp. and subsidiaries, Berger Mfg. Co. and Union Drawn Steel Co., moved its Philadelphia district sales office from the Fidelity-Philadelphia Trust Building, to the Broad Street Station Building, 1617 Pennsylvania Boulevard, effective May 18.

General Refractories Co., Philadelphia, has appointed Broadway Mfg. Co., Knoxville, Tenn., as dealer agent in the Knoxville area.

Armstrong Brothers Tool Co., Chicago, has recently purchased the line of Ideal chain tongs from the Carrier Engineering Corp., Newark, N. J., and is now carrying the complete line in stock and can make immediate delivery on orders.

General Refractories Co., Philadelphia, has appointed Shadbolt & Boyd Co., Milwaukee, as dealer agent in the Milwaukee area.

Savary & Glaeser, Inc., structural steel fabricator, is now located at 102 Washington Avenue North, Dunellen, N. J.

Carter, Milchman & Frank, Inc., 139 Spring Street, New York, has been appointed distributing agent in New York for Barry steel split pulleys and Dickbelt balata belting as manufactured by R. & G. Dick Co., Inc., New York.

Anchor Post Fence Co., Baltimore, has adopted Benthane wire for both fence fabric and barbed wire. According to its manufacturers, this new wire has a protective zinc coating that is 99.997 per cent pure. The coating is applied to the steel base wire by means of a newly developed electrolytic process that deposits the zinc in perfect uniformity to all parts of the wire surface and no tears or drops can possibly form.

Service Supply Corp. and Rental Service Co., Inc., Philadelphia, have opened branch warehouse, display room and office at Fifteenth and Mayflower Streets, Harrisburg, Pa.

ANNOUNCEMENT

concerning change in sales policy of

FRANCKE FLEXIBLE COUPLINGS

WALDRON TORQUE RING COUPLINGS

On and after July 15, 1935, all sales of Francke Flexible Couplings and Waldron Torque Ring Couplings, formerly sold by our General Sales Agents, **SMITH & SERRELL** of Newark, New Jersey, will be handled directly by the John Waldron Corporation of New Brunswick, New Jersey, and its branch offices or dealers.

On and after the above date all inquiries and orders for couplings and parts should be mailed directly to the Main Office of John Waldron Corporation, New Brunswick, New Jersey, or to Francke Dealers.

The Francke Flexible Coupling and Waldron Torque Ring Coupling have always been manufactured by John Waldron Corporation under basic patents which they own and any infringements of same will be vigorously prosecuted. The manufacture, engineering and billing of the couplings will continue exactly as in the past and with the new sales arrangement we believe that closer cooperation with the customer will be maintained.

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MILLBURY, MASS.

Zinc Ammonium Chloride, Its Place in Modern Galvanizing

(CONTINUED FROM PAGE 13)

though the history of ammonia as an ingredient and sal ammoniac as a product is long and interesting, there appears very little data on zinc chloride, prior to its mention in 1842, as a flux, and that reference was of such nature as to make it appear that its use had been long established and was well known at that time.

The earliest reference found to zinc chloride is that by J. R. Glauber,⁹ a German scientist, who refers to it in his "De furnis novis Philosophicis" (Amstelodami, 1648), and another reference states that it was made from chlorine in 1782 by Fridericus A. Gallisch, professor at Leipsic University.

The first reference to the use of

⁹ Inorganic and Theoretical Chemistry, by J. W. Mellor, Vol. 4, Page 535.

¹⁰ A study of Fluxing in Galvanizing, by Dr. Helz Babilik, Metal Industry, Vol. 25, June, 1924.

¹¹ Mech. Mag. and Gazette, London, England, January 1 to June 25, 1842.

¹² British Patent 13442, January, 1851.

¹³ British Patent 1561, July, 1854.

¹⁴ British Patent 472, March, 1855.

¹⁵ British Patent 325540, February, 1930.

United States Patent 1914269, June, 1933.

¹⁶ United States Patent 1965759 and 1965760, July, 1934.

zinc chloride or sal ammoniac as a flux¹⁰ for metallic coatings was in 1802 when Buschendorf in the "Journal des Arts et Manufact., Paris", proposed the use of sal ammoniac in the place of resin for galvanizing. Attention is called here to the fact that as "hot dip" zinc galvanizing was unknown at that time, it is presumed Buschendorf had in mind tinplating.

Fluxes Have Interesting History

Except for this reference in 1802, no further data concerning sal ammoniac or zinc chloride as a galvanizing flux are found until June, 1842, when there appeared in the *Mechanics Magazine and Gazette*,¹¹ London, England, a reference to galvanizing and the statement that the articles to be coated are plunged into a preparing bath consisting of the following mixture: a saturated cold solution of chloride of zinc is made by dissolving zinc in hydrochloric acid; to this is added an equal bulk of a saturated cold solution of sal ammoniac, and to the mixed solution as much more solid sal ammoniac as it will dissolve. The bath may also be formed

of sulphate of zinc and acetate of ammonium, of acetate of zinc and acetate of ammonium, or of any other soluble salt of zinc and ammonia or salt of manganese and ammonia.

In 1851 H. Grissell and T. Redwood¹² of Middlesex, England, were granted a patent on the use of zinc chloride and chloride of potassium, and zinc chloride and chloride of sodium. In their patent they state that "some powdered sal ammoniac is to be sprinkled over the galvanized article according to the usual custom". In 1854 Wm. Hunt¹³ of Tipton, England, was granted a British patent on the use of zinc chloride as a liquid flux. This process called for dipping the article into the flux, drying, and then dipping it into the zinc. In 1855 Hunt¹⁴ was granted another patent, this time on the use of zinc chloride as a flux on the molten zinc in place of sal ammoniac. In describing his process, Hunt points out that it was his observation of the chemical reaction between sal ammoniac and molten zinc, resulting in the formation of zinc chloride, which brought about his experiments in the use of this product and his subsequent patent application.

Zinc ammonium chloride, a chemical combination of zinc chloride and ammonium chloride or sal ammoniac, is described in complete detail later in this article, so mention is made here only to the fact that the first reference to this product was in 1846 and that it was commercially introduced and exploited during the early years of the present century.

Between the years 1930 and 1933 several patents were granted to Todenaz Liban¹⁵, of Poland, on the use of various metallic and organic fluorine compounds in conjunction with zinc chloride and sal ammoniac. The principal claim made in these patents is that a more intense "bite" and speedier cleansing action is added to our present day fluxes. However, practical experiments carried on in this country with these agents have for the most part been unfavorable; excessive clinging of the flux to the material being galvanized, and the ever present danger to the operating personnel from the volatile fluorides constitute two of the major obstacles.

In July, 1934, patents were granted in this country¹⁶ covering the



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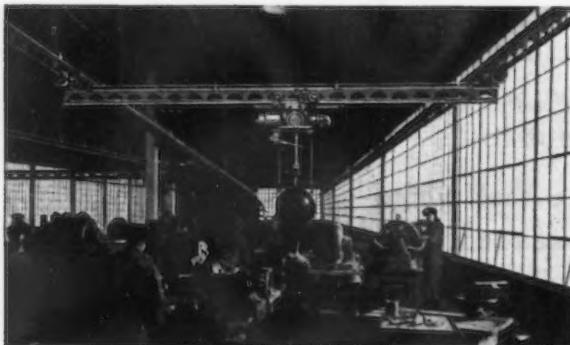
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addition of a foaming agent to zinc chloride, zinc ammonium chloride and sal ammoniac at the point of their manufacture. Since the various products galvanized do not require and cannot utilize a flux of the same depth and consistency, and as galvanizers have always added a foaming agent to the volatilizing flux, with no two employing a flux of the same depth or consistency on similar work, and further, as it is an accepted fact that all foaming agents are not equally successful on all galvanizing operations, the value of a flux containing a predetermined amount of foaming agent, to the galvanizing industry as a whole, would appear to be problematical.

Aside from the introduction of zinc ammonium chloride, the use of fluorine compounds, and the addition of foaming agents to our present fluxes at the point of their manufacture, all patents granted on galvanizing fluxes in this and other countries during the last half century, are mainly on different combinations of the ingredients already found in zinc chloride and sal ammoniac.

Chemical Reactions Described

This article is primarily a brief history and a practical description of galvanizing fluxes in general, and zinc ammonium chloride in particular, and the manner in which the latter is used in modern and correct practice. Consequently no effort will be made to go into detail on the chemistry of what takes place when any of the various fluxes are placed on top of a molten zinc bath, other than to give to those readers who may be interested, and who may not be thoroughly familiar with these changes, a very brief outline of the major chemical reactions found in the breaking down and volatilization of the fluxes under discussion.

While zinc chloride alone is used as a liquid flux just prior to coating, it is seldom, if ever, used as a flux on top of molten zinc. Anhydrous zinc chloride, while having a mild fluxing action when used on a zinc bath, this action being the result of the formation of divalent metallic compounds of the type $M(ZnCl_2O)$, is not used as a volatilizing flux on the bath. This practice results from the fact that it does not contain acid with which to attack and remove the oxide from the surface of the bath and from the surface of the metal to be coated. Thus it fails to pro-



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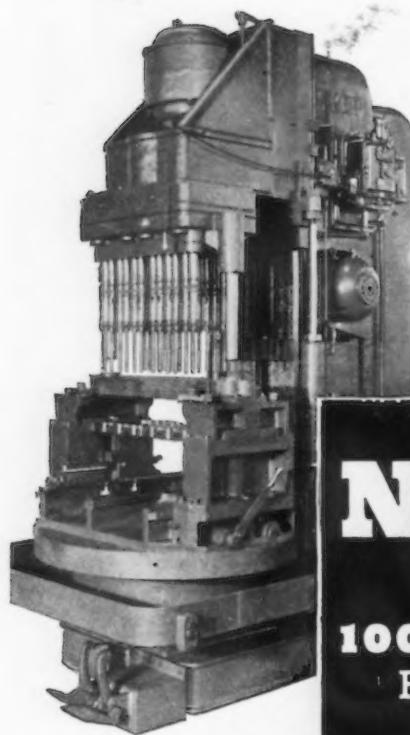
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vide each with a chemically clean surface.

When water is added to commercial anhydrous zinc chloride, hydrochloric acid is formed and at the same time an equivalent amount of zinc hydroxide and oxychlorides, and this action brings out the fluxing properties of zinc chloride. However, additional water entering the flux on the material which is being coated, with the rapid consumption and volatilization of the

hydrochloric acid in the flux, soon saturates the flux with zinc hydroxide and oxychlorides to the point where it becomes dead. This saturation of the flux is also encountered, although at a slower rate, in the galvanizing of dry material.

Ammonia Loss is Rapid

Sal Ammoniac when placed on top of molten zinc more or less immediately volatilizes (this de-

pending somewhat on the temperature, depth of flux, and size of the crystal used), and in volatilizing releases a portion of the ammonia and hydrochloric gas contained in it; these two vapors combine in the atmosphere and form what is called "sal fumes".

During this period of volatilization the hydrochloric gas remaining in the flux attacks any oxide on the material passing through it, any zinc oxide which may be on top of the molten zinc, and also the zinc itself, and in doing so forms zinc chloride and zinc oxychloride. However, with free ammonia which has been released but remains entrapped in the flux, a certain portion of the total flux retains its original identity; namely, ammonium chloride or sal ammoniac.

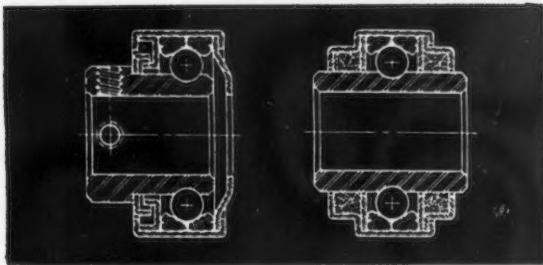
This free ammonia, through a continued cycle of reactions, forming with each cycle zinc ammonia chlorides, materially assists in converting the basic metallic oxides to their corresponding chlorides. The sal ammoniac content of the flux reacting on the zinc oxides and oxychlorides, converts them to zinc and ammonium chlorides, releasing the oxygen in the form of water which vaporizes and forces its way up through the flux into the atmosphere.

As previously stated, during this process part of the sal ammoniac combines with the zinc oxide present and forms zinc chloride, and this soon becomes the major part of the liquid flux which has now been formed. Further, additional zinc chloride is produced by the molten zinc combining with the chlorides carried into the flux on the material which is being galvanized.

This zinc chloride content increases with each minute of flux life; and, while the liquid flux tends to entrap its ammonium chloride or sal ammoniac content, the amount of the latter slowly decreases to the point where the

TABLE I
Effect of Heating on Ammonia Content of Sal Ammoniac

	Original Analysis	Analysis	Analysis
	in First Heating	After Second Heating	After Heating
Per Cent Heating			
Zinc	43.0	43.2	50.0
Ammonia	7.0	5.9	2.0
Chloride	49.0	50.6	45.8
Iron	0.43	0.36	0.48
Insoluble in acid	0.84	...	1.7



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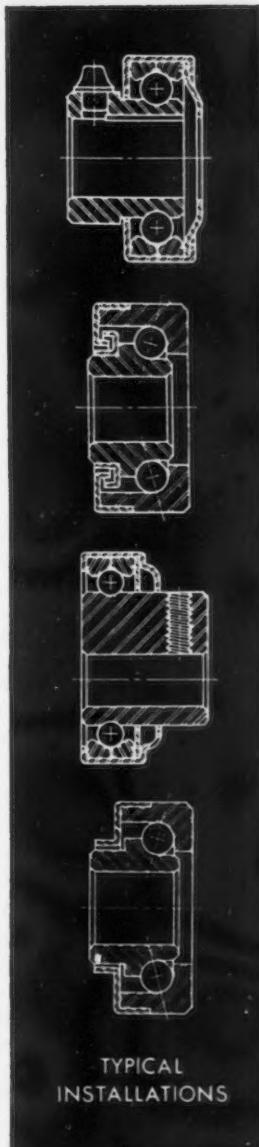
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 a Backbone"*

flux is neither strong enough nor contains sufficient "bite" to efficiently act upon the metal, whereupon further additions of sal ammoniac must be made.

From this it can be seen that while zinc chloride is a necessary part of or body to all known galvanizing fluxes, ammonia, and the combination of ammonia and hydrochloric gas, furnish the intense and speedy cleansing action which is necessary in present-day high-speed galvanizing. This is clearly

Flux No.	Min- utes	TABLE II Effect of Heating on Sal Ammoniac Flux			
		Heating in Flux	Am- monia	Chlo- ride	in Insol- uble Acid
5	0	39.9	6.74	47.8	0.22 1.1
6	15	41.4	5.09	47.8	0.07 0.99
7	30	42.1	4.33	48.0	0.026 1.0
8	45	44.09	3.65	48.1	Trace 1.2
9	60	43.0	3.22	47.2	... 1.27
10	90	45.3	2.53	47.1	... 1.4
11	120	42.3	1.93	42.7	... ...

shown in "Galvanizing", a handbook on zinc coatings by Dr. Heinz Bablik which was published in 1926, as with various tables he shows the importance of ammonia in sal ammoniac and its rapid loss under heat and operation. Two of his most interesting tables are herewith copied.

Table I gives the analysis of a good flux, its composition after being heated to 806 deg. F. for $\frac{1}{2}$ hr., and its composition after still another period of heating at the same temperature, this last composition being considered a "bad or dead flux" inasmuch as when used in practice it burnt itself onto the material being coated.

Table II shows even more clearly this loss of ammonia, and the other important reactions which take place when sal ammoniac is used as a flux on molten zinc. The temperature of the flux in this table is given as 792 deg. F.

The chemical reaction and changes which take place in zinc ammonium chloride when on a zinc bath are the same as in sal ammoniac, except that additions of solid flux are needed at more frequent intervals because of the smaller ammonium chloride content of each addition.

Editor's Note: In a forthcoming issue Mr. Hobbs will describe the evolution of zinc ammonium chloride as a galvanizing flux. Also, its use for galvanizing of various types of materials will be summarized.

"The Strength of Light Steel Joists" is the title of Bulletin No. 79 of the University of Wisconsin Engineering Experiment Station series, recently published. It presents the results of tests made from 1930 to 1932 on various types of light joists designed for building construction. The bulletin suggests basing design upon a "useful limit load" which marks the limit beyond which set and deflection are likely to be objectionable. The tests were made as thesis projects under M. O. Withey, professor of mechanics at the University. The computations were checked and revised by Kurt F. Wendt, instructor in mechanics.

Engineering Courses In Public Schools

THE engineering profession is organizing a nation-wide system of student guidance which, according to an announcement by the Engineering Foundation, research organization of the major engineering societies, will reach every secondary school in the country.

Direct contact will be established with students, parents and teachers through local engineering groups to provide continuing counsel to boys who plan to adopt engineering as a career. High school principals, vocational counselors and other officials will work with hundreds of local engineering committees in every State under the leadership of the Engineers' Council for Professional Development, with headquarters at the Engineering Societies Building in New York.

Details of the plan will be discussed at a meeting in New York on May 20 of the members of the Boards of the Founder Societies and joint organizations. The Founder Societies consist of: the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

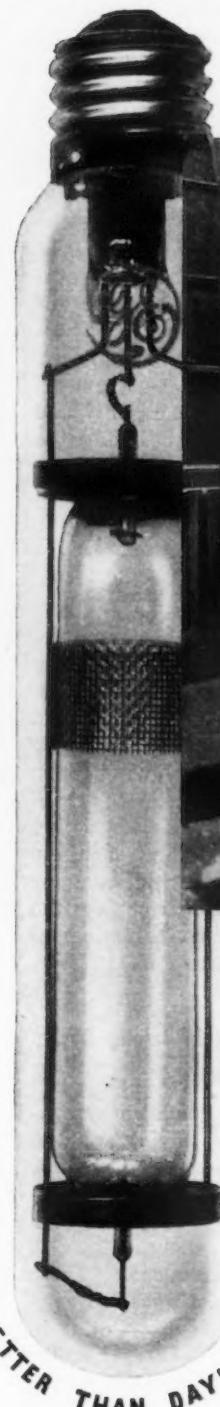
Dean R. L. Sackett of Pennsylvania State College has been appointed chairman of a committee on student selection and guidance which will shape the new educational activity, backed by 100,000 American engineers. The task of the committee, Dean Sackett said, is to discover the engineering type of mind and to interpret engineering "as a career and as a culture."

The members of the committee on student selection and guidance in addition to Dean Sackett include: T. K. Legare, secretary of the National Council of State Boards of Engineering Examiners; R. H. Jacobs, Englewood, N. J.; V. M. Palmer, H. N. Davis, W. B. Plank and O. J. Ferguson.

"Preparing Coal of Higher B.T.U. Value at the Lowest Cost per Ton by Applying Scientific Preparation Methods," is the subtitle of a 32-page coal preparation book, No. 1521, recently released by Link-Belt Co., 300 West Pershing Road, Chicago. The major part of the new book is devoted to the Simon-Carves washing system.

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Higher levels of glareless light with greater uniformity over the entire body. Note the detail visible even within the body under G. E. High Intensity Mercury Vapor Light

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There is no glare from the day-light sensation which these High Intensity Vapor Lamps produce. Detail on the working surfaces stands out in bold relief, as though magnified. The finest scratch is clearly visible and the slightest variation in color shading is immediately noticed. Not only do workers see better, with a minimum of eye fatigue, but with a greater degree of safety. The management profits through a better quality of work and a reduction of loss by spoilage.

Details concerning this modern industrial light, which is being adopted by leaders in industry, are yours for the asking. General Electric Vapor Lamp Company, 833 Adams Street, Hoboken, New Jersey.

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mounted on a vertical shaft driven by an electric motor so that it can be made to slowly turn. It will hold about its periphery 60 double flasks for 6-in. and 8-in. pipe, or 38 double flasks for 10-in. and 12-in. pipe. These are hooked over the rim of the turntable and hang down into the pit with their upper ends just above the turntable. The pit is also equipped with two jib cranes and hoists, which are used for placing patterns, setting cores, pouring and shaking out. On the upper face of the turntable is a circular track on which operates a Giles rammer, which consists of four steel tubes rotated by a motor. These are lowered into as many flasks and as the sand is poured in, are rotated rapidly and gradually withdrawn, packing the sand against the face of the pattern. The bell shape is secured from a hydraulic head pusher operating from the bottom and a hand air rammer is used to ram the sand at the top.

After pulling the patterns, the turntable slowly revolves carrying the molds to the dressing platform, where the mold is dressed and blacked and then on to the drying burners, which are gas heated. The next step is to apply the chill-plate which contains the socket core on the bottom and then the body core is set. Pouring, core bar pulling and shakeout complete the cycle, the used sand being reconditioned and returned to the storage bins by conveyors.

Gas Economized in Baking Body Cores

Body cores are made in a separate division on revolving spindles or "bars" with two coats of mud or loam and one of blacking. For drying these there are five ovens $11\frac{1}{2} \times 16\frac{1}{2} \times 21$ ft. long. Each is equipped with three cars. These ovens stand as a most excellent example of reduced fuel costs due to modernization in firing equipment. Formerly each oven was heated with two blast-type gas burners, firing into a double refractory arch on the bottom, with the upper arch perforated for heat flow into the oven. This method of firing was recently abandoned, the double arch bricked up, and lava tipped pipe burners supplied with high-pressure air-inspirating gas by means of venturi tubes, were put in. These were laid on top of the arch and between the

Pipe Cast Centrifugally Without Chill

(CONTINUED FROM PAGE 16)

whole pipe dipped in a coating tank. The pipe is then given a hydraulic test, weighed and stored.

Long Pipe Made on Turntable Pit

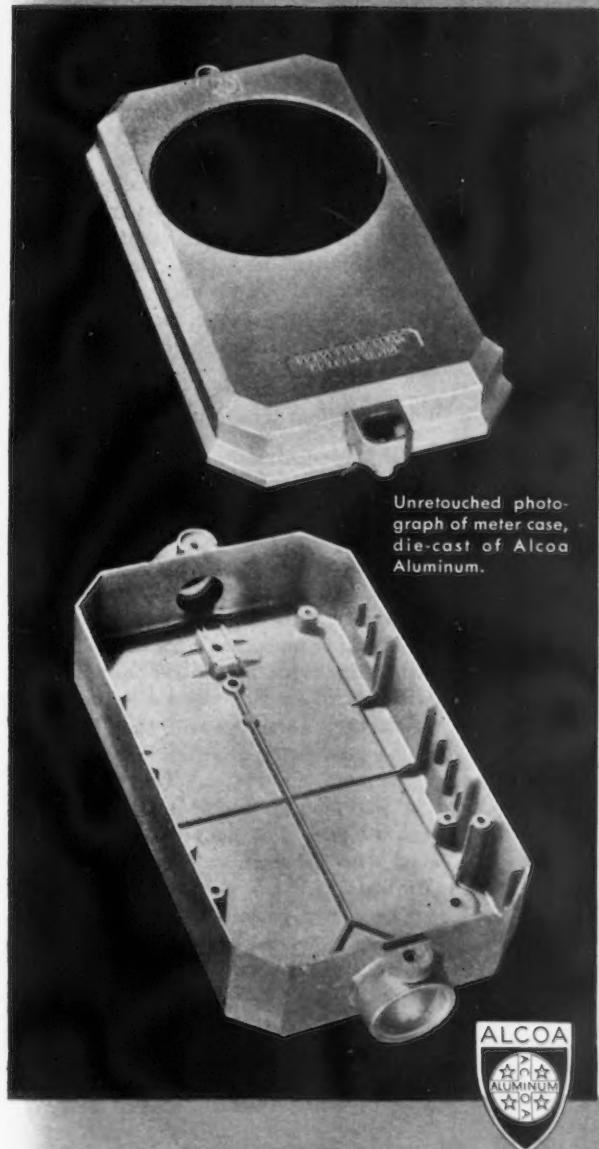
The shop at Bessemer also includes three ordinary pits and one turntable pit, served with four cupolas for making pit cast pipe.

Pipe from 4 in. to 72 in. may be cast in 12 ft. lengths, and on the turntable pit, which is a unique mechanized method of manufacturing pit cast pipe, lengths of 5 meters are made.

The turntable pit is 50 ft. in diameter and is 22 ft. deep. It consists of a circular platform



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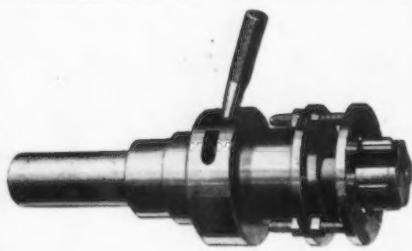
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track ties. A saving of 40 per cent in gas consumption followed the change.

Even a greater saving was made in mold drying. Formerly the vertical molds were dried in the pits by open end gas pipe burners inserted in the lower ends of the molds. These have been supplanted by plate-type gas burners, 16 in. in diameter with rubber hose and casters so that they can be easily pushed under the pipe ends. A saving of 25 per cent in time was

accomplished by both changes (core and mold drying) and a considerable reduction was effected in the annual fuel bill.

Following the shaking out of the finished pipe, it rolls along rails where the core is cut out, the pipe is washed, chipped smooth and is finally heated and dipped in tar. Heating consists in rolling it through a sheet steel oven, 6 x 12 x 14 ft. long, equipped with gas burners. A hydrostatic test and weighing complete the process.

Colorful Finish Accentuates Streamline Appearance of Comet

(CONTINUED FROM PAGE 21)

level effectively ties all of the windows together in an unbroken line, and being flush with the car sides the windows neither add wind resistance nor detract from the streamline effect accentuated by the blue band.

In developing an appropriate color scheme for the interior there were a number of factors to consider. For one thing, the Comet was to be an entirely new train. A distinctly modern conception in

color treatment following the trend in brighter, more cheerful and stimulating colors of the new home decoration seemed both feasible and desirable. Yet where space was limited and comfort important, to run riot with color would both detract from the spaciousness sought and a restful atmosphere.

Still another consideration was the adoption of indirect lighting, which depends entirely upon the reflection values of surrounding

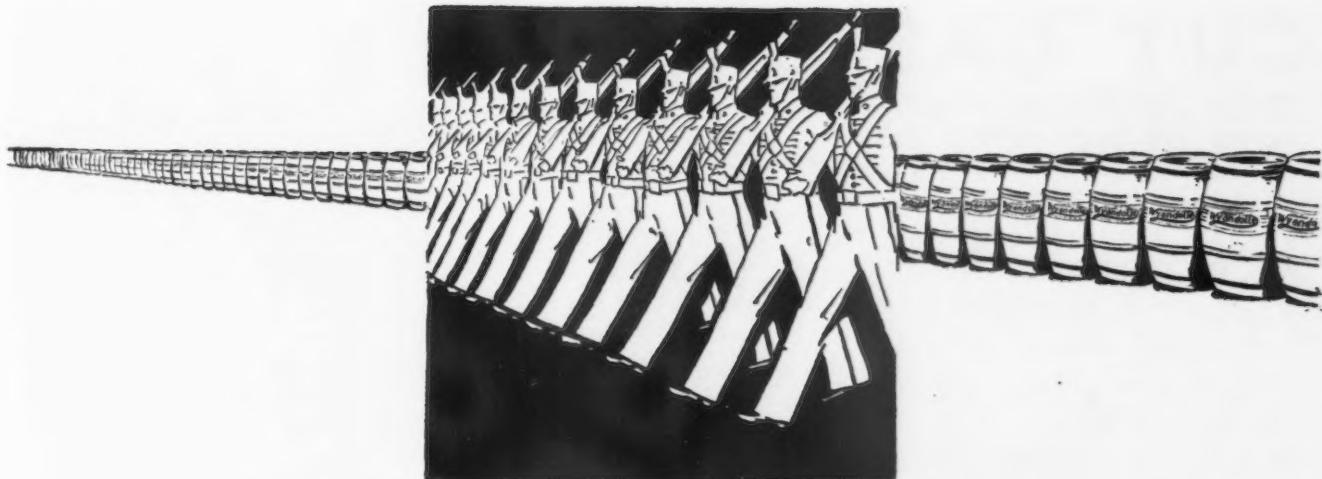
surfaces to spread the light. The final color scheme, developed with the cooperation of the Sherwin-Williams color studios and the Goodyear and New Haven engineers, is unique in its very simplicity. It is built around one fundamental color—brown, which is found on the heating ducts at the floor level. This color dictates the motif, which is carried out in various pastel shades to the ceiling, which is a caenstone, pink-white tint of medium gloss enamel combining dirt resistance with a soft diffusion of light. The use of the practically white ceiling is made possible without the least sensation of clash because of the type of illumination used and to the softening reflections from the more definite color tones on the car walls.

Colors reflect their own color predominantly, with the result a slight cast is produced on the very light ceiling which does not detract from the light-reflecting efficiency but results in a softened color tone. Above the window heads a very light tan is used. Between the windows, on the compartment walls and in the vestibules is a deeper tan, and below the bakelite window sills a dark tan is employed.

Harmonious Ensemble Sought

All appointments have been studied out with a view to forming a harmonious architectural scheme, and it has been possible to select materials that are most attractive in their natural finish. Hardware and fixtures, including the chair frames, are of a natural, satin finish aluminum. The window sills of molded plastic require no further coloring and they are stain-proof and resistant to the burning of cigarettes. The chairs are luxuriously cushioned in rich rust mohair. The floor is cork covered with a brown rubber wearing surface.

The entire ensemble combines to create a spacious, very restful, and cheerful atmosphere. The lighting, too, has been made ample for easy reading without the eyestrain familiarly suffered in standard railroad cars. The extreme simplicity both of the physical makeup and the color scheme is a departure, and it will be of interest to note developments that follow in the design and application of color not only to future trains but to other industrial designs.



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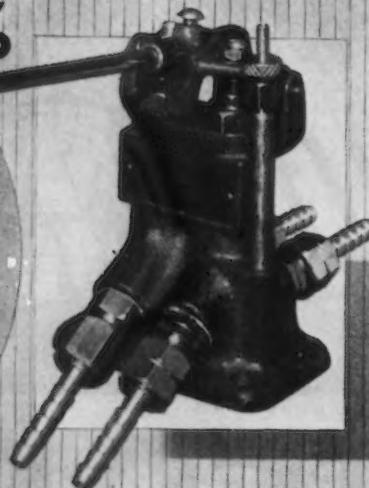


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New Living Standards Reflected In Changing Demands for Steel

THE rise of American living standards and epochal changes affecting the country's transportation are reflected in the record of shifting demand for steel products over the last 36 years, according to an analysis by the American Iron and Steel Institute.

Outstanding changes in the use of steel have been in the decreases in the output of rails and other materials for the railroads and the marked increase in output of sheets, strip, and various products required by the automobile industry.

This shift in demand has created additional employment in the industry. Production of one ton of sheet or strip steel is estimated to require an average of 54 man-hours of labor contrasted with only 30 man-hours needed to produce one ton of rails.

The close of the great railroad building period, when 200,000 miles of tracks were built within one generation and the arrival of the period when the market for rails consisted principally of replacements are both reflected in the dwindling importance of rails in the annual production totals since the period 1899-1903. From 1904 to 1914, an average of more than 3000 miles of new tracks was

built every year, but meanwhile uses for other steel products were increasing so rapidly as to claim a growing share of the total steel produced.

During the five years 1899-1903, rails amounted to 23 per cent of the total rolled products, while in the succeeding five-year period rails were 19 per cent of the rolled products. From 1929 to 1933, however, rails were only 5½ per cent of the total tonnage of rolled steel. In 1934, only 5 per cent of rolled steel production was rails.

But while rails were losing ground relatively, other products were gaining at almost the same rate.

Sheet and strip steel were produced in relatively small quantities 40 years ago, the tonnage of these products from 1899 to 1903 averaging only 6½ per cent of the total tonnage rolled. In contrast, sheets and strips amounted to 23.2 per cent of rolled steel production from 1929-1933, and 27 per cent in 1934.

In the nineties, the automobile was hardly more than a curiosity in an inventor's workshop, but within a comparatively few years the automobile industry grew to be by far the largest single user of sheets and strip, requiring today

about 36 per cent of all sheets and approximately half of the strip steel produced. Many of the features of modern automobiles have been made possible primarily by metallurgical developments in sheet and strip manufacture.

The rising importance of sheet and strip in the total steel tonnage likewise has been accelerated by the increasing popularity of mechanical refrigerators, sheet steel kitchen stoves, steel furniture, washing and ironing machines and other household furniture and equipment. Farming equipment and machinery likewise are estimated to use more than 100,000 tons of these products in a single year.

Increased importance of tin plate among steel mill products is believed to reflect changing eating and cooking habits as well as important refinements in the art of canning.

Nearly all of the tin plate produced is used to make cans and other containers for foods, motor oils, etc. From 1899-1903, only 3 per cent of the steel rolled was tinned and sold as tin plate. Since then, the importance of tin plate among steel products has steadily increased. In 1934, the tonnage of this product amounted to more than 7 per cent of the year's production of rolled steel.

Coincidental with the increase in importance of sheet, strip and tin plate has been the rise of stainless and other alloy steels, more than half of which go into automobiles. Other major uses for alloy steels are in farm implements, machine tools, oil producing and refining, building construction and decoration. The stainless alloy steels, in addition to many industrial uses, are widely used for cutlery and other household possessions.

Production records of these modern steels extend back only to 1909; before that year the tonnage produced was negligible. In the five years 1909-1913, less than 2 per cent of the steel ingots produced were classified as alloy steel. Through succeeding years, this ratio has grown, reaching 6 1/3 per cent for the period 1929-1933. Complete figures for alloy steel production in 1934 are not yet available, but it is estimated that 7 per cent of the ingots were alloy.

Relative importance of structural shapes, wire rods and steel plates has varied little over the 35-year period covered by the Institute's study. Since 1894, shapes have averaged close to 10 per cent of the total tonnage of steel rolled; plates have averaged about 12 per cent.

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